

# 2 GREAT WAYS TO LEARN!

READ OUR GUIDES • WATCH THE VIDEOS

**FREE  
VIDEOS**

LEARN PHOTOGRAPHY  
THE EASY WAY WITH  
OUR VIDEO GUIDES!

# The Ultimate Canon SLR Handbook Volume 4

**NEW!  
VOLUME 4**  
220+ PAGES  
OF PHOTO  
ADVICE



## Take your camera skills to the next level

**FREE VIDEOS!**

**60** mins of video guides  
on creative Canon  
photography projects

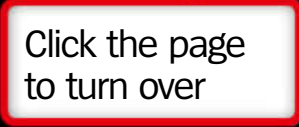
A **Photomasterclass**  
from the makers of **PhotoPlus**

Future

Three easy ways to enjoy this digital edition...

## Three easy ways to enjoy this digital edition...

When zoomed in, drag to pan





# The Ultimate Canon SLR Handbook Volume 4

## Welcome...

**Welcome to the Ultimate Canon SLR Handbook Volume 4.** In this new Canon EOS DSLR photography guide, we have all-new techniques, tutorials and tests to help you get the very best out of your camera and kit.

The following 220+ pages are packed with expert advice, plus 10 pop-out video guides for following our Canon skills and photo projects.

Inside chapter one, we have four big Canon camera skills guides, from the A-to-Z of the Canon EOS System and a Manual vs Auto modes challenge, to capturing great shots in bad weather and how to Make Cash With Your Canon.

Chapter two includes ten fantastic photo projects for you to try to improve your camera and photo techniques, all backed up with great video guides. Learn how to shoot live gigs, birds in flight and beach portraits. You'll also master HDR, finally understand hyperfocal distance, and benefit from our brilliant black-and-white photo tips.

In chapter three we have a seven-part Canon School course to help you go in depth and understand key photographic techniques, from exposures, shutter speed, apertures and ISO, to white balance and metering.

Top Canon professional photographers reveal what's in their kit bags in chapter four's Pro Kit section. You'll never guess what some of these guys carry!

Then, in chapter five, we round things off with our essential gear tests, including beginner Canon DSLRs and the incredible 50-megapixel EOS 5DS, lens tests of wide-angle zooms, portrait primes, and macro lenses, plus the latest dedicated flashguns. All our tests include extensive lab data results to help you make informed decisions on your next DSLR and kit purchases.



**Peter Travers, editor**





# CONTENTS

Future Publishing Limited  
Quay House, The Ambury, Bath BA1 1UA  
[www.digitalcameraworld.com](http://www.digitalcameraworld.com)

Editor	Peter Travers
Operations Editor	Adam Waring
Art Editor	Chris Hedley

## FUTURE PUBLISHING LIMITED

Head of Photography	Matt Pierce
Group Editor in Chief	Chris George
Group Art Director	Rodney Dive
Content & Marketing Director	Nial Ferguson

## ADVERTISING

Senior Sales Executive	Tel: +44 (0)1225 788186
Sasha McGregor	<a href="mailto:sasha.mcgregor@futurenet.com">sasha.mcgregor@futurenet.com</a>

## CIRCULATION & MARKETING

Trade Marketing Executive	
Michelle Brock	<a href="mailto:michelle.brock@seymour.co.uk">michelle.brock@seymour.co.uk</a>

## PRINT & PRODUCTION

Production Co-ordinator	
Vivienne Calvert	<a href="mailto:vivienne.calvert@futurenet.com">vivienne.calvert@futurenet.com</a>

## LICENSING

Senior Licensing and Syndication Manager  
Regina Erak [regina.erak@futurenet.com](mailto:regina.erak@futurenet.com)  
Phone: +44 (0)1225 442244 Fax: +44 (0)1225 732275

Printed in the UK by William Gibbons on behalf of Future.  
Distributed in the UK by Seymour Distribution Ltd,  
2 East Poultry Avenue, London EC1A 9PT.  
Phone: +44 (0)20 7429 4000

**Future** Future produces carefully targeted magazines, websites and events for people with a passion. Our portfolio includes more than 180 magazines, websites and events, and we export or license our publications to 90 countries around the world. Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR).

Chief executive Zillah Byng-Thorne  
Non-executive chairman Peter Allen  
Chief financial officer Penny Ladkin-Brand  
Tel: +44 (0) 1225 442244 [www.futureplc.com](http://www.futureplc.com)

All information contained in this magazine is for informational purposes only and is, to the best of our knowledge, correct at the time of going to press. Future Publishing Limited cannot accept any responsibility for errors or inaccuracies that occur. Readers are advised to contact manufacturers and retailers direct with regard to pricing.

© Future Publishing Limited 2015. All rights reserved.  
No part of this magazine may be used or reproduced without the written permission of the publisher.



We are committed to only using magazine paper which is derived from well managed, certified forestry and chlorine-free manufacture. Future Publishing and its paper suppliers have been independently certified in accordance with the rules of the FSC (Forest Stewardship Council).



154



32





88

## Camera skills

A to Z of the Canon EOS DSLR system	8
Dial M for Manual	22
Great shots, whatever the weather	32
Make cash with your Canon	42

## Projects

Hyper-real HDR	56
Polarized opinions	60
Music to your eyes	62
Let there be light!	66
Hyperfocally speaking	70
Create brilliant black & white images	74
In-flight entertainment	78
Shoot in the sea	82
Make the time fly	84
Mad hatter's tea party	88

## Canon school

The photographic journey	94
How to handle your Canon DSLR	100
The importance of aperture	106
The need for shutter speed	112
Understanding ISO	118
In-camera metering	124
The importance of white balance	130

## Pro kit

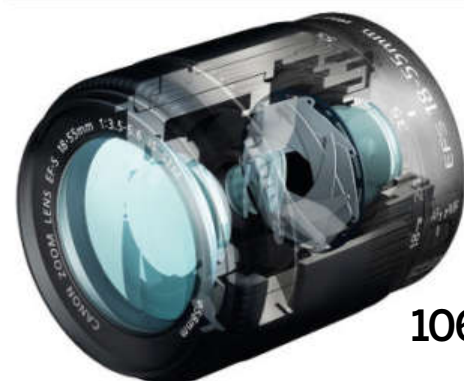
Alex Hyde	138
Brett Harkness	140
Oliver Wright	142
Victoria Hillman	144
Andrea Denniss	146
David Clapp	148
Adam Gasson	150



140

## Gear tests

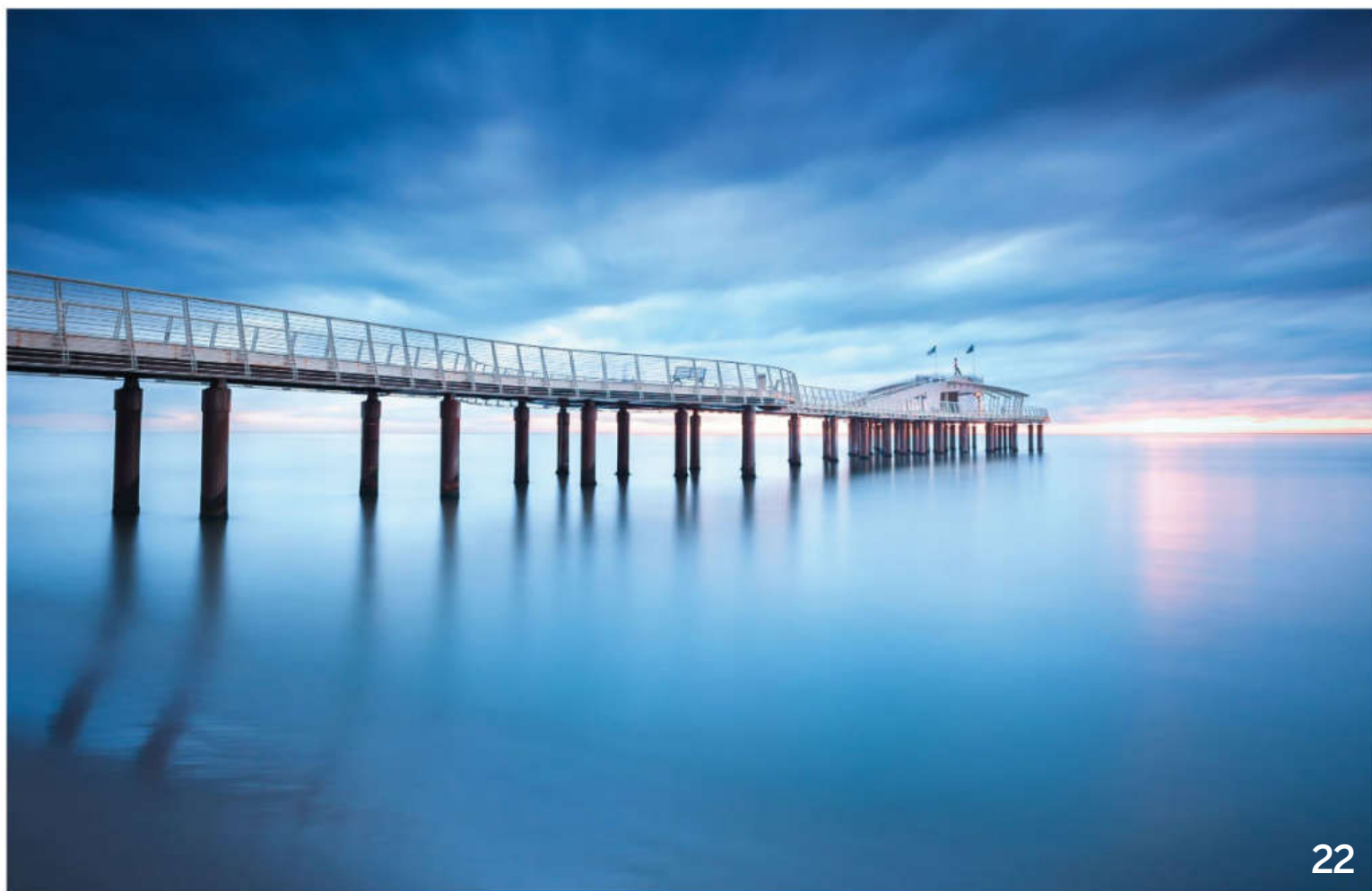
Beginner EOS DSLRs	154
Wide-angle zooms	166
Portrait primes	178
Canon EOS 5DS & EOS 5DS R	190
Macro lenses	198
E-TTL flashguns	210



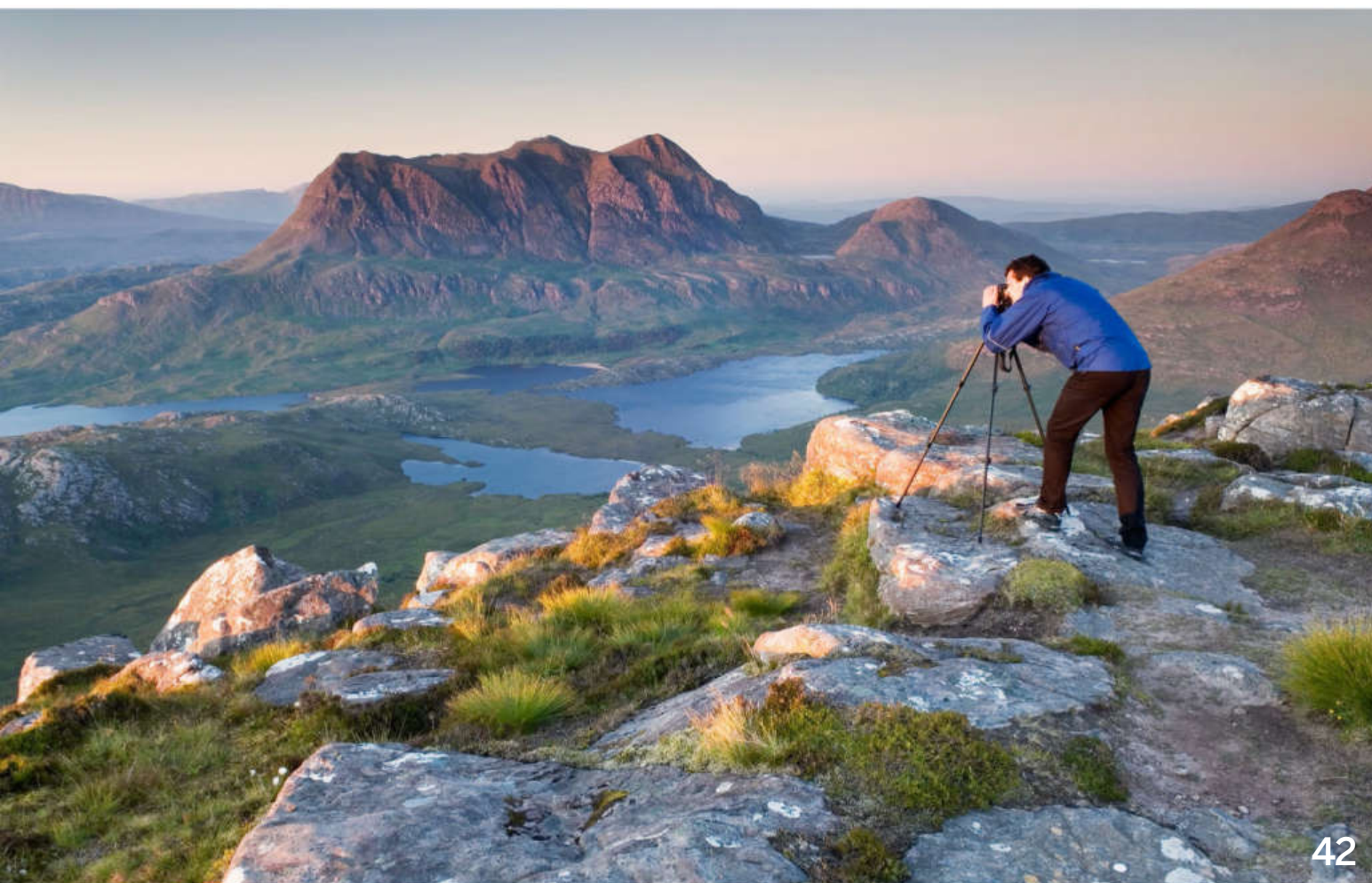
106

# Camera skills

- |                                     |    |
|-------------------------------------|----|
| A to Z of the Canon EOS DSLR system | 8  |
| Dial M for Manual                   | 22 |
| Great shots, whatever the weather   | 32 |
| Make cash with your Canon           | 42 |









## CONTROL YOUR CANON

# A TO Z OF THE CANON EOS DSLR SYSTEM

*From Autofocus to Zoom lenses: learn all about the cameras, lenses and other kit in the EOS system in our in-depth guide*

**T**he Canon EOS DSLR system is about much more than just cameras. It incorporates lenses, flashguns, GPS units, Wi-Fi units, image processing software and much more – in fact, it's everything you need to produce stunning images, from pressing your camera's shutter button to editing and printing out your photos.

In this guide you'll discover all you need to know to help you get to grips with your

EOS DSLR, including exposure modes and settings, autofocus and other shooting settings, and tips on using the LCD and viewfinder displays. You'll also learn about EF lenses, flashguns and flash settings, printers, and Canon's Digital Photo Professional software, amongst other topics.

Over the next 13 pages we'll equip you with key skills, and share our top tips, to help you get more out of the EOS system, and your photography, with our amazing and in-depth A to Z guide...





# A is for... Autofocus

The autofocus systems in EOS DSLRs have never been more intelligent or more accurate. All the models in the EOS range offer a variety of AF points – from nine points in cameras like the EOS 700D, 100D and 1200D, up to 65 points in the EOS 7D Mk II. By default your camera's AF system is set to Auto, so the camera will select the AF point it thinks should be in focus – usually the AF will lock on to the nearest subject in the frame. For greater flexibility – and to focus on the subject you want the AF to lock on to – you can manually select a specific AF point, or group of points.

Selectable AF point

65 points

21 points

9 points

INFO Help

You can set your Canon DSLR's autofocus system to use all its AF points, or select individual points or groups of points for more precise focusing

## AUTO LIGHTING OPTIMIZER (ALO)

ALO is available on all current EOS DSLRs, and is designed to even out contrast by selectively adjusting areas of the image. It's great for backlit subjects, as it can detect faces and brighten them for a better, balanced exposure. It can be set to Low, Standard or Strong, but only affects JPEGs, not Raw files.

## ANTI-FLICKER SHOOTING

The Anti-flicker shooting function of the EOS 7D Mk II, EOS 5DS and EOS 5DS R cameras is designed to ensure optimal exposure when you're shooting in environments that are lit by fluorescent or flickering light. In A+ mode anti-flicker shooting is automatic.

Anti-flicker shoot.

Disable

Enable

If [Enable] is set, the shutter release time lag may become longer or continuous shooting speed may become slower

High-end EOS DSLRs have an Anti-flicker shoot mode

## ZONE AF



## SINGLE-POINT AF



# B is for... Bracketing

Depending on your DSLR, you can bracket exposures between +/-5 or +/-3 stops in 1/3-stop increments for three successive shots, enabling you to capture a range of exposures of the same scene: overexposed, underexposed, and standard for what the camera thinks is the 'correct' exposure. This improves your chances of getting a perfect exposure in tricky lighting; you can also combine shots for a high dynamic range image.

## -1 STOP



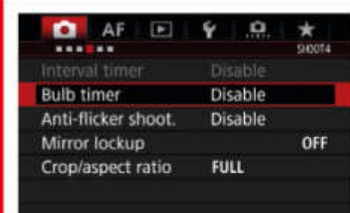
## STANDARD



## +1 STOP



It's a good idea to bracket exposures in high-contrast lighting conditions – if you can't pull all the shadow and highlight detail out of one of the shots you can combine images to capture the scene's full tonal range



## BULB MODE







This variable shutter speed setting is designed for when you want exposures of more than 30 seconds. You open the shutter, and the exposure continues until you close it again. To eliminate camera vibration, however, a cable release or wireless remote must be used. With many EOS cameras you need to switch to Manual (M) exposure mode to access the Bulb, or 'B' mode.

## BEEP

If you're fed up with the beeping sound that confirms when autofocus has been achieved you can turn it off. The Beep option in the camera menu is set to 'On' by default – just scroll down to select 'Off' to cancel it!

# CONTROLYOURCANON

## C is for... Custom Functions

					
				C. Fn1: Exposure	
Exposure level increments					1/3
ISO speed setting increments					1/3
Bracketing auto cancel					ON
Bracketing sequence					0—+
Number of bracketed shots					3
Safety shift					OFF
Same expo. for new aperture					OFF

Custom Functions enable you to customize various features of your Canon DSLR to suit your picture-taking preferences. Depending on your camera model you'll have access to different Custom Functions, but in all cases they cover several main areas of camera setting customization – Exposure (see above), Image, Autofocus/Drive, Display/Operation and Others. You can select and adjust the Custom Functions through your camera's menu system – you don't have to use them, but it's a good idea to spend a little time acquainting yourself with the various Custom Functions available on your EOS camera to see which ones can help you to use your camera more efficiently. Note that some Custom Functions do not function when you're in Live View mode or during movie shooting.



### CONTINUOUS SHOOTING

Each EOS camera has a maximum continuous shooting speed measured in frames per second – from 3fps on the 1200D up to 14fps on the 1D X – for capturing fast-moving action. The number of images that can be shot continuously also varies from camera to camera. See also 'D is for Drive modes'.

### C MODES

The Custom, or C, modes on high-end EOS DSLRs enable up to three favourite camera setups (C1, C2 and C3) to be saved and instantly recalled via the Mode dial. To register a Custom mode, choose your preferred exposure mode and set up the camera accordingly, then choose Camera User Settings in the Setup menu.

	AF				
SET UP4					
Custom shooting mode (C1-C3)					
Clear all camera settings					
Copyright information					
Certification Logo Display					
firmware ver.: 1.0.0					

## D is for... Drive modes

The drive modes on EOS DSLRs enable you to select how many images are captured, and at what speed. There are four main drive modes: Single Shooting (only one image is taken when you press the shutter button), Low-speed Continuous (L), High-speed Continuous (H), plus the self-timer options. Select the desired mode by pressing the Drive button and turning the Main dial (or scrollwheel, depending on model) or by using the Quick Control Screen.

If your EOS camera has a top LCD panel you'll find the **DRIVE** button in front of this

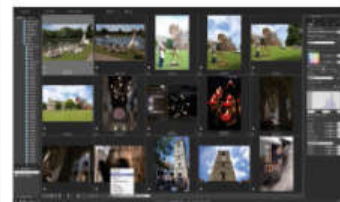


### DEPTH-OF-FIELD PREVIEW

Pressing the depth-of-field preview button on the front of your EOS DSLR enables you to check the exact depth-of-field (range of acceptable focus) in your images.

### DIGITAL PHOTO PROFESSIONAL (DPP)

Digital Photo Professional, or DPP for short, is Canon's Raw image management and editing software. It comes free on a disc with all EOS DSLRs, and it has three main functions: it enables you to view and organize your images; process Raw files and edit your images; and output the edited images. Download DPP4 from Canon's site at [http://bit.ly/get\\_dpp](http://bit.ly/get_dpp) but you'll need one of the latest Canon DSLRs and your serial number.





**EOS 1200D****EOS 100D****EOS 700D****EOS 750D****EOS 760D****EOS 70D****EOS 6D****EOS 7D MK II****EOS 5D MK III****EOS 5DS****EOS 5DS R****EOS 1D X**

## E is for... EOS DSLR range

The EOS SLR legacy began in 1987 with the launch of the EOS 650 film SLR camera. The current line-up of EOS digital SLRs is split into three main categories: Beginner – EOS 1200D, 100D, 700D, 750D, 760D; Enthusiast – EOS 70D, 6D, 7D Mk II; and Professional – EOS 5D Mk III, 5DS, 5DS R and 1D X (along with the EOS 1D C, which is primarily a 4K movie camera).

EOS cameras are designed to cater for the needs of photographers from beginners to top professionals, although the 760D straddles two categories, and could also be classed as an enthusiast DSLR. And while the fast and robust EOS 1D X is often used by professional sports and wildlife photographers, the smaller, easy-to-carry 7D Mk II is also proving popular with pros. The

new 50-megapixel 5DS/R cameras are designed for serious professionals who demand the very best image quality and need to produce large images, while the 23Mp EOS 5D Mk III is more suited to photographers such as wedding and landscape photographers and photojournalists, who need to be able to move around more freely.

The basis of the EOS DSLR range is that there's a camera to suit everyone's needs and abilities, and you can progress through the range as your skill levels and confidence increase. What all EOS DSLRs offer is flexibility, a degree of customization over your settings and full compatibility with Canon EF and/or EF-S lenses, flashguns, and various other EOS system accessories.

### EXPOSURE COMPENSATION

Exposure compensation can be applied to brighten or darken the standard exposure set by the camera. It can be set in the Av, Tv or P shooting modes by up to +/-5 stops, depending on the camera, in 1/3-stop increments. You can check the exposure compensation setting via the exposure level indicator on the rear LCD, in the viewfinder, or on your camera's top LCD, if it has one. Exposure compensation is adjusted by pressing the Av +/- button, then rotating the Main dial left or right, or by using the rear thumbwheel on advanced models.

### E-TTL FLASH

Canon's Evaluative Through-The-Lens (E-TTL) flash technology sets the power level for Speedlite flashguns automatically. In E-TTL mode the camera takes an ambient meter reading, and instructs the Speedlite to fire a low-power pre-flash. The camera meters the flash coming back from the subject and compares it to the ambient reading. Metering zones that measure significantly brighter under flash than ambient are assumed to be reflective objects, and aren't included in the exposure calculation.

## F is for... Flash

The EOS system boasts a sophisticated flash capability that ranges from the built-in, pop-up flashgun featured on many EOS DSLRs – which is useful for fill-in flash to light subjects close to the camera – to the sophisticated radio wireless flash systems of the Speedlite 600EX-RT flashgun. Many of the newer EOS DSLRs enable you to control the flash from the camera's menu, and enables photographers to use either the built-in flash or a Speedlite attached to the hotshoe to operate as the 'master' flash and fire compatible remote 'slave' flashguns.



Flash enables you to fill in shadows on portrait subjects for more flattering results



### FLASH EXPOSURE LOCK (FEL)

Flash Exposure Lock enables you to attain a proper flash exposure for a specific part of a subject. Just aim the viewfinder centre at the subject, then press the M-Fn or '\*' button (depending on the camera model), recompose, and take the picture.

### FULL-FRAME

The EOS 5D series, the 1D X and the 6D have full-frame 36x24mm sensors, which replicate the size of 35mm film and are larger than those on APS-C models. Full-frame cameras tend to produce images that are sharper, with finer detail and more 'depth'.



## G is for... Green Square mode

Full Auto mode (aka 'green square') is marked by the green rectangle on the mode dial of your EOS DSLR. The Full Auto (green box) or Scene Intelligent Auto (A+) modes, depending on your camera model, both work in the same way – by analysing the scene and selecting the optimum settings to capture it. Your camera will take care of everything from metering the scene to setting the ISO, and will also change the AF mode from One-shot AF to AI Servo AF if your subject moves or is moving; the flash might pop up if lighting conditions are low. In A+ mode it will also set an 'Auto' picture style, which adjusts colours, too. To shoot in Full Auto mode just point your camera at the subject, press the shutter button halfway for an AF point to achieve focus, then fully depress the shutter button to take the image.



Full Auto mode enables users who aren't ready to take full control over settings to get good results in most situations



### GPS UNITS

Canon's GP-E1 and GP-E2 GPS units enable you to include details of where pictures were shot in the image metadata. The GP-E1 unit features an electronic compass and GPS signal receiver to record time, longitude, latitude and elevation, whilst the GP-E2 offers image geo-tagging, with tagging and logging features that enable you to see exactly where your images were taken.

### GRID DISPLAY

You can display a grid on your camera's viewfinder to aid composition, via the tools menu. The grid display – either a 3x3 grid or a 6x4 grid – can also be displayed on the rear LCD during Live View shooting.





# H is for... Histogram

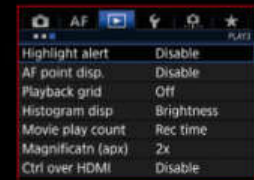
The histogram display in Playback mode gives you a quick, accurate guide to exposure. Watch out for the graph being cut off abruptly at either end, which indicates 'clipping', and a loss of detail in the shadows and/or highlights. To avoid blowing highlights, the rule of thumb is always to expose as far to the right of the histogram as possible without cutting it off. Note that both histograms and the flashing highlight warnings on the rear screen are based on JPEG data, as processed out by the camera, so if you're shooting Raw you have more latitude in the highlights than the camera



suggests, and you can afford to overexpose the highlights slightly, even if the highlight warning is flashing – we're not talking whole stops, but 1/3 to 1/2 a stop can make the difference between a good picture and a great one.

## HIGHLIGHT ALERT

The Highlight alert facility can be found in the Playback menus of most EOS DSLRs. This shows you where the overexposed areas in your images are, enabling you to adjust your settings accordingly.



The Highlight alert can be enabled or disabled

## HD MOVIE SHOOTING

Introduced in the EOS 5D Mk II, all EOS DSLRs now offer Full HD movie recording at a variety of frame rates and maximum recording times.



## HIGH-SPEED SYNC

High-speed Sync mode enables you to shoot in bright sunlight with flash and still use wide apertures. Pulsed light is fired to achieve good coverage across the sensor, even when the shutter speed is too fast to expose the whole sensor at once.



The movie options vary between EOS DSLRs

# I is for... In-camera processing

First introduced in the EOS 60D, in-camera processing of Raw images eliminates the hassle of having to transfer images from your camera to a computer in order to convert them. The camera processes the Raw file, before converting it into a JPEG image. The parameters that can be adjusted during in-camera processing include brightness, white balance, picture style, auto lighting optimizer, high ISO speed noise reduction, quality and resolution, colour space, peripheral illumination correction, distortion correction and chromatic aberration. Note that M-Raw and S-Raw images can't be processed in-camera – they have to be processed using Canon's DPP software.

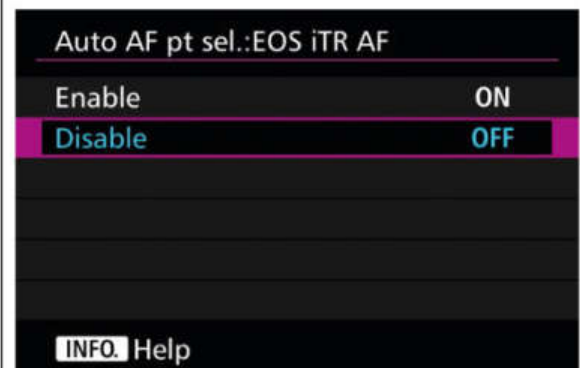


In-camera Raw processing enables you to enhance and convert images without transferring them to a computer



## ISO SETTINGS

ISO, or sensitivity, settings have gone so high in the digital age that you can shoot without flash in almost complete darkness. The highest current ISO setting on an EOS camera is the maximum expansion setting of ISO204,800 on the EOS 1D X. As a rule of thumb, in daylight you won't normally need to go higher than ISO800. (More on ISO in Canon School, see page 118.)



## INTELLIGENT TRACKING & RECOGNITION (iTR) AF

High-end EOS cameras including the 5DS and 5DS R feature Canon's Intelligent Tracking and Recognition (iTR) AF system for speedier focusing. The system identifies colours and faces to enable faster and more accurate focusing, but focusing may be slowed down if there's no face or strong colours in the scene.

# CONTROL YOUR CANON

## J is for... JPEGs

Because they're compressed in-camera, JPEG files are not as large as Raw files – but they offer you less flexibility for image processing, as they contain less image information for you to work with. Depending on the camera, EOS DSLRs have a variety of JPEG quality options, and you can also choose to shoot Raw+JPEG, which means you'll have JPEGs for easy processing and sharing, but will also have the Raw files as backup if you need to recover highlight information, for example.

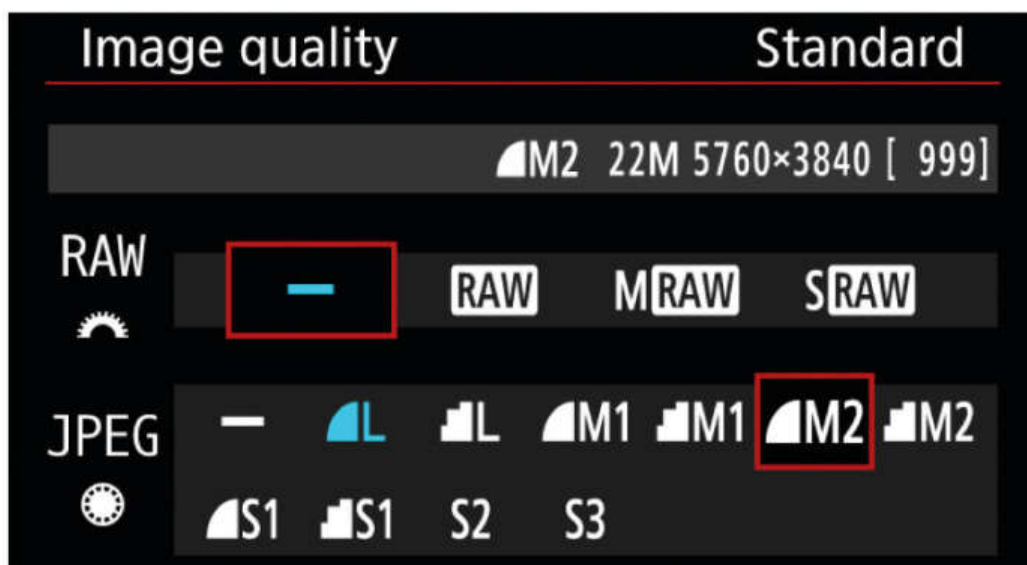
### JUMP DISPLAY

The 'Jump display' options enable you to select how quickly you can browse images in Playback mode. They're accessed via the Playback menu, and enable you to go through images one by one, ten at a time or 100 at a time using the Main dial. Other options include displaying images by date, by folder, movies only, stills only or by image rating.



## K is for... Kelvin

The Kelvin setting in EOS cameras enables you to set the colour temperature in degrees Kelvin, in 100K increments. If you have a separate colour temperature meter the Kelvin setting may be a better option than the WB presets, as you can set the exact temperature shift needed, but you'll need to take a few test shots to calibrate your meter with the camera's meter.





# L is for... Lenses

Canon's extensive range of over 90 lenses means there's a lens for every genre of photography, and for every skill level and budget. The lineup of EF, EF-S and L-series (Luxury, or professional) models includes zoom and prime lenses along with specialist fish-eye, macro and tilt-shift lenses, with focal lengths ranging from 8mm up to 800mm. EF-S lenses are specifically designed to be used with the Canon cameras that have APS-C format sensors (namely the EOS 1200D, 100D, 700D, 750D, 760D, 70D and EOS 7D Mk II), while EF lenses can be used with both APS-C and full-frame DSLRs. Those lenses with IS in their name incorporate Canon's Image Stabilizer technology, which can apply the equivalent of up to five stops of stabilization in terms of shutter speed to eliminate camera shake in hand-held shots. Canon's L-series lenses offer high-end features such as advanced optics and weatherproofing; these are easy to spot, as they have a red ring near the front of the lens barrel.

Canon's vast collection of lenses means you're sure to find the perfect piece of glass, no matter what you shoot and whatever your budget

## LIVE VIEW SHOOTING

Live View shooting enables you to take pictures while viewing the image on the camera's rear LCD. Live View also raises the camera's mirror out of the way, so you're seeing exactly what the camera's sensor is seeing, and when you're in Live View mode you can zoom in on parts of the image to check your focusing.

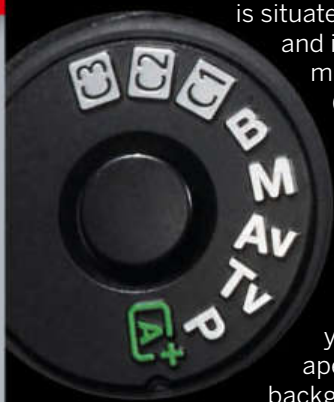
## LCD PANEL

The rear LCD panel enables you to view and adjust settings, compose shots (see above) and review images. Some models, including the 750D and 760D, have vari-angle LCDs that enable you to see the screen from above or below, or even from the front of the camera.



# CONTROL YOUR CANON

## M is for... Mode dial



The Mode dial on EOS DSLRs is situated on the top plate, and includes the shooting modes, such as Av (Aperture Priority), Tv (Shutter Priority) and M (Manual). Aperture Priority mode enables you to control the aperture value, which is essential if you want to use a wide aperture to blur portrait backgrounds; the camera

selects the shutter speed, taking into account the metering mode and any exposure compensation that has been set. In Shutter Priority mode you choose the shutter speed – useful if you want to freeze action or capture motion blur – and the aperture is set by the camera. Manual mode gives you full control over the exposure settings, so you can select the shutter speed and aperture values you want.



### METERING MODES

The majority of EOS DSLRs offer four metering modes – Spot, Partial, Centre-weighted and Evaluative – which take an exposure reading from increasingly larger areas of the scene to measure the brightness of the subject or scene.

### MANUAL FOCUSING

You can focus a shot manually when you want to control exactly which parts of a subject or scene are in sharp focus, for example when you're composing macro images or landscapes. For the best results you should mount the camera on a tripod and use Live View mode, so that you can zoom in to check the focus.

### MIRROR LOCKUP

Mirror Lockup enables maximum sharpness in tripod-mounted long exposures, by raising the mirror before the exposure starts to eliminate even slight vibrations.

Mirror lockup	
Disable	OFF
Press  twice to shoot	
Shoot 1/8 sec after press	1/8s
Shoot 1/4 sec after press	1/4s
Shoot 1/2 sec after press	1/2s
Shoot 1 sec. after press	1s

## N is for... Noise reduction

In-camera noise reduction can be applied to images shot at high ISOs, or when you're seeking to reduce noise in long exposures. Older EOS cameras have just one noise reduction option, but newer models have two options: 'High ISO speed NR', which can be set to Standard, Low, High or Disable, and 'Long exp. noise reduction', which can be set Auto, Enable and Disable. To adjust the setting for either option, turn the Main dial to scroll to the desired setting, then press the Set button.



### NIGHT PORTRAIT

This shooting mode is designed to deliver a better-looking portrait at night, or in low light, by combining flash with a slow shutter speed to give a brighter background and more even lighting across the frame.

Your DSLR's noise reduction options are useful for images shot at high ISOs, or long exposures

## O is for... One-shot AF

One-shot AF mode suits most subjects that remain stationary while you take a photo. Compose your subject in the viewfinder and half-press the shutter button – among other things, this activates the autofocus. The lens will then attempt to achieve focus, and if it does so successfully a green focus confirmation indicator will appear in the viewfinder, and the in-focus beep will sound (unless you've deactivated it). As long as you keep pressure on the shutter button the focus point won't change, so you

can recompose the shot if needed while keeping your subject in focus, for example to place a portrait subject off-centre.

Other AF modes include AI Servo AF and AI Focus AF. AI Servo AF is ideal for capturing moving subjects when the focusing distance keeps changing – as long as you keep the shutter button half pressed the subject will be focused continuously. AI Focus AF automatically switches the AF mode from One-Shot AF to AI Servo AF if a still subject starts moving.

### ORGANIZING FILES IN-CAMERA

To help you organize your images in-camera the setup (yellow) menu gives you the choice of naming folders for images. You can also use the menu to register or change file names via the Change User Setting 1 and 2 options.



You can rename images and create folders to keep your images organized





## P is for... Program mode

Program mode (P) sets the aperture and shutter speed values for you, depending on the light levels and your lens. However, Program mode does give you a measure of control – you can change the shutter speed or aperture combination by rotating the Main dial, and the camera will increase one setting while decreasing the other to maintain a correct exposure.



### PRINTERS

Canon offers a full workflow solution, from taking pictures through to printing out the processed images, and the PIXMA PRO series of desktop printers can produce superb, gallery-quality prints. The latest PRO-10S and PRO-100S models offer Cloud connectivity as well as Wi-Fi and Ethernet, so you can produce prints wherever you are.

### POWER FOCUS

First seen on the Canon EF 300mm f/2.8L IS II USM and EF 400mm f/2.8L IS II USM telephoto lenses, Power Focus is a mode that enables you to drive the electronic focus motor without having to turn the focus ring. Instead, you use the focus preset ring – by turning this a little, you can drive the focus motor slowly, and by turning it a greater distance it can be driven faster. This enables you to do smooth focus pulls with the long lenses, which is particularly useful when shooting movies with EOS DSLRs.

## Q is for... Quick Control Screen

The Quick Control Screen on EOS DSLRs makes changing settings via the rear LCD quick and easy – just press the Q button to access it. However, if you're trying to use the Quick Control Screen and it doesn't seem to be working, it's most likely because you have the Custom Function for AF Point Selection method set. If C.Fn III-3 is set to Option 1 for Multi-controller direct, the Quick Control Screen won't be accessible – disable the Custom Function and you can use the Quick Control Screen again. The new Canon 5DS also offers a Custom Quick Control Screen (see screen shots below) you can edit and customize the contents, size and placement of the information fields, so that only the functions you really need to see are shown.

The Quick Control Screen enables you to easily alter key settings



### Custom Quick Control

Start editing layout

Revert layout to default

Clear all items

Choose and arrange  
Quick Control items

MENU



Add item

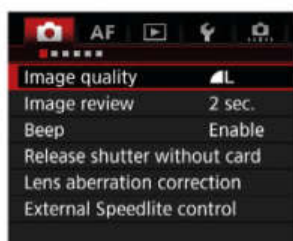
Remove

### QUICK CONTROL DIAL

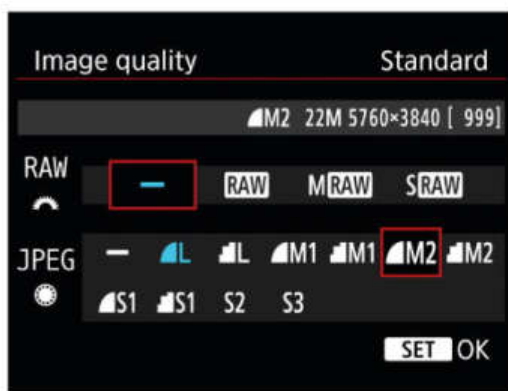
The Quick Control Dial on the back of many recent Canon EOS DSLR cameras has a number of functions, but essentially, once a function (such as white balance, AF, drive modes or flash exposure compensation settings), or any menu tab, has been selected the dial enables you to quickly scroll through the options to choose the settings you wish to adjust.

## R is for... Raw image quality

Your EOS camera offers a wide range of image quality options, but to get the best results you should always shoot uncompressed 'Raw' files, as these capture the maximum amount of tonal information, from bright highlights through to shadows, for optimum image quality. Raw images also give you greater flexibility when editing your images, and enable you to recover detail that would be lost if you shot JPEGs – they're almost always worth the extra space they take up on memory cards. The EOS 1D Mk III camera saw the introduction of the small Raw (S-Raw) file format, which shoots slightly less high-resolution images, thus saving space on memory cards and computers. Like full-sized Raw images, S-Raw images can be processed using Canon's DPP or programs such as Lightroom.



You can check that your Canon DSLR is set up to capture Raw or JPEG images via the Image Quality option in the shooting menu



### RADIO FLASH OPTIONS

The Canon radio wireless flash system gives you extensive control over remote Speedlites, either via the camera menu or from a Speedlite ST-E3-RT transmitter, or the Speedlite 600EX-RT and new 430EX III-RT flashguns. However, it's worth noting that one setting that cannot be changed remotely is the zoom setting of remote Speedlites. To avoid any problems, be sure to set the zoom head to your desired setting before you place any Speedlite unit in its remote position; if you don't, the unit will use the default remote flash head setting of 24mm, which might be too wide for your needs.



### REMOTE SHOOTING

The EOS Remote app is an Android and iOS application that enables a smartphone or tablet to connect wirelessly to EOS camera with built-in Wi-Fi. The app can currently be used with the EOS 6D and 70D, and performs two main functions:

1. It enables you to view images stored on your camera, and download them to your smartphone or tablet – this enables you to check for focus and exposure on a larger screen than the one on the camera. You can also assign ratings to images, or delete them if you don't want to keep them on the card. You can also view an image's basic EXIF data – including the shutter speed, aperture and ISO – and you can share images via email.
2. It enables you to remotely control your camera directly from your smartphone or tablet. If you have access to a Wi-Fi network you can use infrastructure mode, where both the smartphone and camera are on the same network. If there's no network connection, the smartphone and camera can be connected via an AdHoc mode – essentially the phone and camera generate their own Wi-Fi network.

### RATE BUTTON

On some EOS models you can rate your images in-camera, using a Rate button to the left of the rear LCD screen. This enables you to rate images from 1-5 stars, and stores the rating in the EXIF data to help you to sort your pictures later.

## S is for... Scene Intelligent Auto

Scene Intelligent Auto mode, denoted by the A+ green symbol on your camera's mode dial, is similar to Full Auto mode, as it analyses the scene and selects the best exposure settings to capture it, leaving you free to concentrate of framing the shot; it will also adjust the autofocus settings depending on whether a subject is stationary or moving, and it will activate the pop-up flash, if necessary, in low light or for backlit scenes. However, in A+ mode your DSLR will also set an 'Auto' picture style, which adjusts colours too.

The Scene Intelligent Auto mode is easy to spot on the Mode dial – it's the green box with the 'A+' symbol



### SILENT TOUCH CONTROL

The EOS 1D X and EOS 5D Mk III feature a Silent Touch Control pad on the Quick Control Dial. During HD movie shooting, this is used to adjust settings without the risk of dial clicks to be recorded on the audio track. It's very effective for adjusting the audio level; however, if you adjust the aperture, you should check the audio track afterwards, as you may find that the internal microphone has picked up the sound of the motor driving the aperture blades. To avoid this, use an external microphone that won't pick up the lens motor.

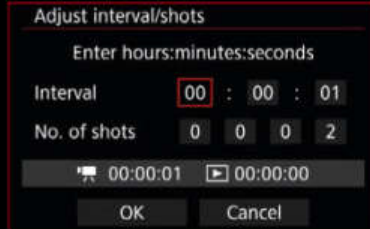
### SAFETY SHIFT

Safety Shift is a custom function designed to enable some level of override when using Tv or Av modes, in conditions where the light levels may change suddenly. When it's enabled the camera will adjust the shutter speed or aperture to give a correct exposure.



# T is for... Time-lapse

A time-lapse is a series of images captured at intervals, then turned into a movie to condense hours or even days of action – a flower opening, or clouds moving across a sky, for example – into minutes or seconds. When shooting time-lapse sequences there's no need to shoot full resolution images – you'll simply waste memory card space and spend much longer resizing your images on the computer. Instead, set the quality to one of the smaller settings – S-Raw if you want the benefits of RAW files, or S-JPEG if you're happy with JPEGs. The EOS 60D introduced the ability to shoot in different ratios, including 16:9. So to avoid having to process



**The 7D Mk II has an interval shooting timer built in; you can also use a remote control equipped with a timer, or an intervalometer**

images on the computer, you could select 16:9 shooting and S2; this will give you full 1920x1080 HD-sized images to drop into your HD movies.

## TWO-IMAGE PRIORITY

When in AI Servo mode on the EOS 7D Mk II, in the second AF menu you can customize 1st and 2nd image priority to suit your shooting style or subject. For the 1st image the options are equal priority (equal priority is given to focusing and shutter release), release priority (priority is given to shutter release rather than focusing) and focus priority (the image won't be taken until the subject is in focus). For the 2nd image the options are equal priority, shooting speed priority (priority is given to the continuous shooting speed instead of achieving focus) and focus priority.

## ▶ TONE PRIORITY

Tone priority – aka Highlight Tone Priority (HTP) – wrings more tonal range from the brightest areas of images. It gives a small but significant advantage when shooting skies with white clouds or other bright subjects.



# U is for... USB



If you want to trigger an EOS DSLR camera remotely, but don't want to invest in a full Wi-Fi system, then a USB cable (provided in the box with the camera) will also work. For more range, longer USB cables can be used, although anything over ten metres is probably better served by using Wi-Fi. To access remote shooting, simply plug the camera into the computer with the USB cable and open Canon's EOS Utility software. Select 'Camera settings/Remote shooting' and you'll then be able to control the camera directly from the computer. The EOS 5DS, 5DS R and 7D Mk II are compatible with SuperSpeed USB 3.0, thus enabling faster transfer of image files to computers when shooting tethered.



**Use a USB cable to connect your DSLR to a computer running Canon's EOS Utility**



## ▶ USER-DEFINED SETTINGS

User-defined settings on EOS cameras include options for altering the preset picture styles, enabling you to create your own style by adjusting the Sharpness, Contrast, Saturation and Color Tone parameters via the Picture Style menu option.

## ▶ UDMA

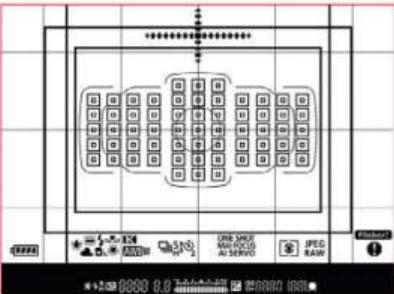
The EOS 7D Mk II is capable of shooting up to ten full 20.2-megapixel photos in a single second, recording images as Raw, JPEG or both at the same time. Infinite JPEG or 31 Raw files can be captured at 10fps without any loss in performance (when using a UDMA 7 card), and the shooting rate can be customized to suit the pace of the subject being photographed, with images recorded to dual CF and SD card slots.



# CONTROLYOURCANON

## V is for... Viewfinder information

The 'Intelligent Viewfinder' in the EOS 1D X, EOS 5D Mk III, EOS 7D Mk II, EOS 70D, EOS 5DS and EOS 5DS R models uses a transmissive LCD that enables the cameras to display additional useful information within the viewfinder, including AF points, Zone, Spot or Expansion AF points and a grid when required. When the camera is turned off the display will appear milky due to light scattering, but once the camera is powered on the display becomes clear. To avoid the screen becoming cluttered you can choose what information the LCD displays, or even to have it show none at all.



The Intelligent Viewfinder can display a wide array of useful shooting information



VF display illumination	
Auto	AUTO
Enable	ON
Disable	OFF
AF point during AI Servo AF	
OFF	
[AF-ON] AF point during AI Servo AF	
[INFO.] Help	

You can tailor what information is displayed in the camera's viewfinder, or even turn it off entirely if you prefer

### VIDEO SHOOTING

When shooting EOS Movies, the general rule of thumb is to shoot at a shutter speed that is double your frame rate. However, under certain conditions, such as scenes lit with fluorescent bulbs, LEDs or tungsten light, or when filming a monitor or TV screen, you may see scanning lines in your footage. If this happens, the simplest solution is to adjust the shutter speed; you can go faster or slower, but when you're filming another screen reducing the shutter speed is usually the best option.

### VIDEO INPUTS/OUTPUTS

Since the advent of the EOS 5D Mk II, Canon DSLRs increasingly feature video input and output connections on the left side of the camera. By using the HDMI output to connect an external monitor, additional features of the monitor, such as focus peaking and zebra bars, can be used (although not all monitors will provide these features) thus helping to speed up production.



### VIDEO SNAPSHOT MODE

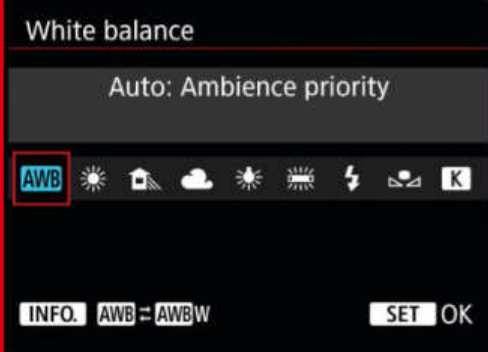
The EOS 600D added a new feature to movie shooting: Video Snapshot mode. This captures short clips of two, four or eight seconds in length, which are then stitched together into a single file called a 'Video Snapshot Album'. After selecting the length of the Video Snapshot clip, each time a movie is recorded it will be that length.

## W is for... White balance

Daylight has a different colour temperature at different times of the day (see K is for Kelvin), as do different types of artificial lighting. The white balance

system on your EOS DSLR enables the camera to correct colour casts or tints under different lighting conditions, such as daylight and indoors, or under fluorescent lighting or flash. Out of the box, your camera's white balance will be set to Auto White Balance (AWB). This means the camera is always trying to normalize the colour temperature, correcting warm orange (sunsets) or cool blue light towards more neutral tones.

The EOS 5DS and 5DS R feature a choice of AWB settings: the Ambience Priority setting, which is designed to retain some of the warm colour tones from artificial light sources (similar to AWB on other EOS cameras) and the White Priority setting, which eliminates the warmth from tungsten lighting to produce colour-neutral images.



The EOS 5DS and 5DS R give you a choice of a couple of Auto White Balance settings: Ambience Priority and White Priority

### WIRELESS FLASH

There are two types of wireless flash control in the Canon system. The newest and most versatile is the Radio Wireless system, introduced with the Speedlite 600EX-RT. The original system is an optical pulsed light system. The Radio Wireless system enables the 600EX-RT to be used either as a radio master to trigger other flashguns, or as a radio slave, but in the latter setup it must be controlled by another 600EX-RT unit or the Speedlite Transmitter ST-E3-RT.

### WI-FI SHOOTING

When using the EOS 6D's built-in Wi-Fi module to transfer images, you may find that some files do not transfer. If this happens, it's most likely because they're Raw files; the EOS 6D Wi-Fi module can only transfer JPEG images wirelessly. If you wish to use the Wi-Fi functionality, but still shoot Raw files, make sure you set the camera to Raw+JPEG shooting. This way the camera can send the JPEG file, but you'll still have a Raw file to process later, if required.



## X is for... X-sync speed

The x-sync speed, commonly called sync speed, is the fastest speed at which the built-in flash will synchronize with the camera, and it varies by camera model. When using High-Speed Sync (HSS) flash with Canon EX Speedlite flashguns, where the shutter speed is faster than the x-sync of the camera you'll find that the flash power is greatly reduced. If you need to shoot at faster shutter speeds, for example so that you can use a wide aperture to achieve a shallow

depth of field, or to freeze the motion of a fast-moving subject, then as the shutter speed increases you'll find that the flash power continues to fall off the faster you go. To overcome this, if you need a lot of light the solution is to use more flashguns. For example, if the flash power drops to half you'll need to use two flashguns to have the equivalent of one full-power flash; if flash power drops to a quarter then you'll need to use four flashguns, and so on.



With faster shutter speeds you may need to use more than one flashgun

## Y is for... Yellow filter effect

Your EOS DSLR's picture styles include a Monochrome option that enables you to simulate the colour filters you might use when shooting black-and-white photography: Yellow, Orange, Red and Green. Yellow produces more natural blue skies and crisper white clouds; Orange gives a slightly darker blue sky and more brilliant sunsets; Red darkens dark blue sky and gives crisper and brighter autumnal leaves; and Green produces fine skin tones, plus foliage that will look crisper and brighter. You can increase the contrast of a filter for even stronger effects.



Choose a Monochrome picture style that suits the colours of the sky and other elements in a landscape

## Z is for... Zoom lenses



Canon's lineup of zoom lenses ranges from the EF 8-15mm up to the EF 200-400mm f/4L IS USM Extender 1.4x which, with its built-in teleconverter, goes up to a focal length of 560mm. Regardless of focal length, all Canon zooms offer an AF/MF switch on the lens barrel, so you can choose to rely on the autofocus, or fine-tune the focus manually (using Live View) when the switch is set to the MF position.



A zoom lens with long telephoto reach is essential for shooting wildlife

### ZONE AF

Zone AF enables you to manually select a zone, or cluster, of AF points out of all the AF points on your camera. For example, the EOS 5D Mk III lets you to choose from nine zones spread across its 61 AF points. You can navigate through the zones via the AF point selection button and the M-Fn button.



THE CANON CHALLENGE

# DIAL M FOR MANUAL

*It's the ultimate challenge: a man armed with manual modes vs a fully auto Canon DSLR... who will win?*





DIAL M FOR **MANUAL**

**O**nly robots rely on the automatic modes on their Canon DSLRs and editing software, right? *Real* photographers use manual options to really take control of their photography...

Well, maybe it's time to think again. Over the next 19 techniques challenges, you'll discover who's really calling the shots: you or your camera. We compare key automatic EOS camera options with their manual counterparts, and go head to head with Adobe software's auto corrections. From shooting modes to exposure, focusing to processing, we reveal when it's best to control your DSLR manually and when you can rely on auto settings...

# Shooting Modes

This is it. The cream of the Basic Zone auto scene modes taking on the manual Creative Zone options. . .

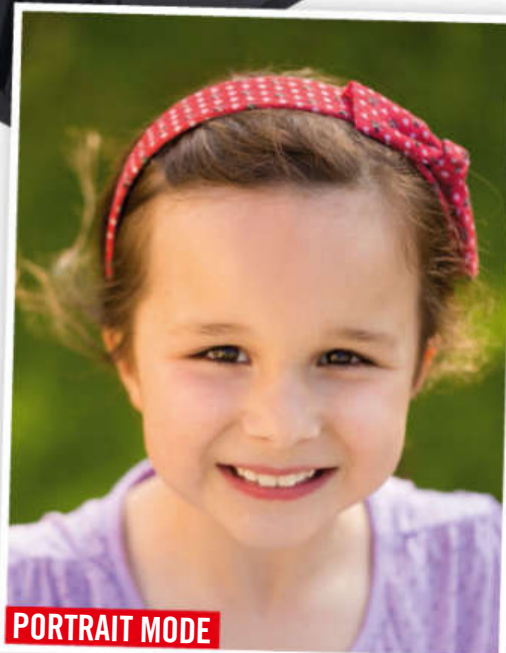
## CHALLENGE 1

### Portrait mode vs Aperture Priority

Portrait mode sets a wide aperture on the lens (f/2.8 in our example) to blur the background, bumping up the ISO, as necessary, to ensure the shutter speed is fast enough to give sharp handheld results. It may also trip the pop-up flash, even if you don't want it to. You don't have any control over the array of AF points in the viewfinder either. This means that the camera may not pick out a person's eyes, so you can end up repeatedly half-pressing the shutter release until it locks on. Aperture Priority gives you all this control, and makes it easier to brighten up your image with exposure compensation, too.

**WINNER: MAN**

### APERTURE PRIORITY



### PORTRAIT MODE

We chose an aperture of f/5.6 to bring more of the facial features into focus – and we made sure that we focused on the eyes, too...

The Sports mode worked surprisingly well for creating sharp images of fast subjects, but creative options are limited

## CHALLENGE 2

### SPORTS MODE vs SHUTTER PRIORITY

We put Sports mode through the benchmark test of shutter speed and AF performance: an aerial aeroplane assault. These stunt planes are unpredictable and challenging to photograph when swooping against detailed backgrounds and bright skies. As anticipated, like any automatic or semi-auto shooting mode, Sports isn't always in form when it comes to exposure. The day was bright but overcast, and images were routinely underexposed. Whereas with +1 stop of manually dialed exposure compensation, our plane shots are perfectly exposed. Although you can adjust the brightness in Sports modes, you can't do this 'live', having to dip into the Quick Control menu. But at least on some new EOS models you can record images as Raw files, enabling you to go some way to rescuing exposures later.

**WINNER: MAN**





DIAL M FOR **MANUAL****CLOSE-UP**

Live View focusing and recording Raw images (on newer DSLRs) makes Close-up mode more useful than it seems. However, Program mode gives you more control over depth of field

**CHALLENGE 3****Close-up mode vs Program**

Using the Close-up mode on our 6D, the aperture was locked at f/5.6, with the ISO fluttering between 100 and 1600 in an attempt to give a fast enough shutter speed to kill the effects of camera shake. The built-in flash of other EOS cameras would be fired if it couldn't do this. Again, with no control over the AF points, the autofocus was largely all over the shop. However, switching to Live View gives more freedom where focusing is concerned. For general close-up work, the auto option here isn't half bad.

**WINNER: CAMERA**



Landscape mode set an exposure of 1/125 sec, f/11, ISO100; which wasn't bad, if slightly underexposed

**MANUAL****CHALLENGE 5****Landscape mode vs Manual**

As you'd expect, Landscape mode is all about giving you narrowish apertures for a decent depth of field. It will set a shutter speed according to the conditions and lens being used, increasing the ISO to give you reasonably fast shutter speeds – sometimes sacrificing image quality as a result. As you can see in our example, you can't become an autopilot when using this mode and it has a tendency to underexpose scenes with bright skies.

**WINNER: MAN**



SCORES

3

MAN

2

MACHINE

**CHALLENGE 4: MAN vs COMPUTER****LIGHTROOM AUTO TONE vs MANUAL ADJUSTMENTS**

Lightroom offers plenty of automation to make your workflow smoother, with the Auto Tone option offering a one-click fix for exposure, contrast and shadow/highlight detail. There's no easy way to say this: the computer is more efficient at doing this than the hand of man, with near-instantaneous results. Who'd have thought? Even if the result isn't perfect, it provides a decent starting point for fine-tuning your images.

**WINNER: COMPUTER**

# MAN vs CAMERA

## Exposure

Who's *really* in charge when it comes to nailing exposure – you or your EOS? Let the challenges commence. . .

### CHALLENGE 6

#### Evaluative metering vs manual override

The camera's default multi-zone Evaluative metering pattern measures brightness across the picture, but then biases the exposure towards the AF points that have (or almost have) achieved focus. In theory, this is great. The area you want to be well exposed is likely to be the in-focus subject,

right? Well, what if that part of the subject is very bright or very dark? This can lead to the rest of the scene being underexposed or overexposed. Large areas that are light in tone or dark in tone can throw the exposure out too, and it's only by overriding the exposure by dialling in compensation, using exposure lock on another part of the scene or shooting in Manual, that you can redress the balance.

**WINNER: MAN**



Taking a manual exposure reading, or using exposure lock to fix the brightness, isn't as fast as using an EOS with a Quick Control Dial to dial in exposure compensation

#### WELL EXPOSED



#### TOO BRIGHT





DIAL M FOR **MANUAL****CHALLENGE 7****AUTO ISO vs MANUAL ISO**

We've got to hand it to Canon here: Auto ISO is one of the best automatic options on an EOS DSLR. It's far quicker to set the ISO to Auto and let the camera handle the sensitivity than it is to do it manually, with the ability to set minimum and maximum values enabling you to keep a firm hand on image quality. Being able to set a minimum shutter speed in Aperture Priority or Program adds to the versatility of this option, too.

**WINNER: CAMERA**

**ISO speed settings**

ISO speed	100
ISO speed range	100–25600
Auto ISO range	100–3200
Min. shutter spd.	Auto

**Min. shutter spd.**

Shutter speed  
1/250

AUTO	1/250	1/125	1/60
1/30	1/15	1/8	1/4
0"5	1"		

INFO Help

Auto ISO is dead useful, enabling you to restrict the sensitivity range the camera can tap into, as well as the slowest possible shutter speed to prevent camera shake

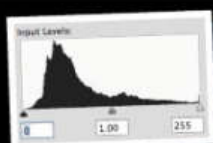
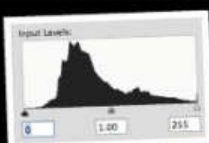
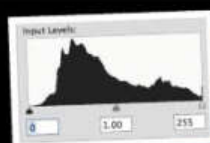
**MANUAL**

A close one, this. E-TTL isn't perfect and needs some adjustment to get the best results – it's slightly underexposed the flower here – but it's very fast and convenient

**E-TTL****CHALLENGE 8****E-TTL flash vs Manual flash**

E-TTL flash is easy to live with day to day. It generally does a good job of balancing the exposure of a backlit subject with a bright background and its level of 'fill' on bright days looks natural – although on dull days we often tone it down by 1/3 or 2/3 stop. It can be fooled by light or dark subjects too, leading to a little underexposure or overexposure. You can fix this with flash exposure compensation, but switching to Manual flash gives you consistent output, regardless of the subject. But you need to keep an eye on how far the flash is from the subject. Overall, E-TTL wins.

**WINNER: CAMERA**

**ORIGINAL****AUTO LEVELS****CURVES**

Auto Levels has opened up the shadow detail here (see how the histogram shifts to the right) while Auto Curves brings back more of the punch and mood of the original shot

**CHALLENGE 9: MAN vs COMPUTER****LEVELS & CURVES**

The majority of automatic options in imaging software shouldn't be seen as an instant click-and-forget fix. That's certainly true of Auto Levels and Auto Curves

in Photoshop, where the tonal pushing and pulling can lead to increased noise and a little clipping on the histogram. But, again, they provide a great base for further 'human' tweaks, particularly if you apply them as adjustment layers in Photoshop.

**WINNER: COMPUTER**

SCORES

4 **MAN**

5 **MACHINE**







## Focusing

Think you're a sharp-shooter? Focusing is the toughest challenge yet, so keep calm and carry on reading...

### CHALLENGE 10 Accuracy test: One-Shot AF vs manual focus

In good light and with plenty to 'bite' onto, One-Shot AF is rapid and, seemingly, accurate. But check your images at full size and you may be disappointed. The thing is, there's a lot that can get in the way of AF accuracy: the lens might suffer from back-focusing or front-focusing; the AF point may cover a number of details and lock onto the wrong one; zooming the lens may cause the focus to shift. Using Live View in magnified view is a different beast altogether, as what you see is what you get. So, with a little aid from the camera, Man wins this one...

**WINNER: MAN**



Live View and manual focusing combined is the only way to go when shooting close-ups

### CHALLENGE 11

### SPEED TEST: AI SERVO AF vs MANUAL FOCUS

We used our 'gull test' for this one – a challenging subject to push any AF system – and the camera won hands down when it came to tracking the fast, erratically moving subjects on a gusty day. Naturally, top-end cameras in the EOS line, when matched with ring-USM EF lenses, can acquire focus and track the subject faster and more reliably than others. We used Canon's stunning EF 70-200mm f/2.8L IS II USM zoom on both a 6D and 5D Mark III. An unfair test? Put it this way: none of our manually focused images were sharp enough. Not one.

**WINNER: CAMERA**





DIAL M FOR **MANUAL**

Using back-button focusing to essentially switch between AI Servo AF and One-shot AF on the fly takes some getting used to, but it works a treat and is more reliable than AI Focus

**CHALLENGE 12****Reaction test: AI Focus AF vs back-button focusing**

AI Focus AF switches from One-Shot to AI Servo when the camera detects movement, then switches back again. As a test of its effectiveness, we compared it with a 5D Mark III set to back-button focusing. With the AF mode set to AI Servo and focusing deactivated from the shutter button but instead controlled with the AF-ON back button, this effectively mirrored AI Focus mode. In our tests, AI Focus couldn't detect movement quick enough and simply couldn't keep up.

**WINNER: MAN**



White balance 'correction' can be overrated, in our opinion – it's effective at removing coolness from images, but can also strip out warmth from sunsets

**CHALLENGE 13: MAN vs COMPUTER****WHITE BALANCE**

The Auto White Balance option in Canon's Digital Photo Professional and Adobe's Camera Raw and Lightroom acts in a similar way as the AWB option on your camera. It's useful for general scenes, but when you're trying to preserve the colour of the light and the mood it gives a picture, then it doesn't always deliver. In our experience, using the presets – or using the eye dropper and then fine-tuning with the Temperature and Tint sliders – works better.

**WINNER: MAN**

**AUTO****MANUAL****CHALLENGE 14****Auto AF point selection vs manual AF point selection**

Having all the AF points activated in the viewfinder means that the camera chooses what to focus on. In our tests, invariably this proved to be the closest thing to the lens or an area of movement or high contrast, and that didn't always correspond with the subject or detail we wanted to be sharp. Using auto AF point selection to act as a 'net' for moving targets can be useful, but there's a strong chance it will lock onto background details too. Manually selecting the AF point makes a huge difference for creative focusing...

**WINNER: MAN**

It was no surprise when the camera's Auto AF points locked onto the nearest element when shooting through foreground detail







## Image settings

Processing. It's a dirty job, but someone's gotta do it. And that means *you*! Or, erm, the camera. Let's see who's best...

### CHALLENGE 15

#### Auto picture style vs picture style preset

The Auto picture style option generates a colour, contrast and sharpness profile that the camera determines is optimized for the scene you're photographing. And you know what? It doesn't do a bad job at all. If there's a blue sky or greenery in the frame then it boosts the colours, although they can look more natural than with the often overcooked Landscape picture style. Indoors, the results are closer to the Standard setting. Despite the Auto setting delivering slight variations from one picture to the next and being rubbish for movies (where you need consistent results between clips) we'll give this one to the camera.

**WINNER: CAMERA**

Auto picture style gives a bolder but still believable colour palette straight out of the camera



### CHALLENGE 16

#### AUTO WHITE BALANCE vs WHITE BALANCE PRESET

Canon's Auto White Balance (AWB) can be relied upon to reduce colour casts in the majority of shooting situations. But in our experience it can struggle in overcast conditions, leading to cool-looking images. Strong colours in the frame can also see it trying to compensate incorrectly too. Manual presets are generally better, although even they can't fix all colour casts without a little white balance compensation. At least the presets give you frame-to-frame consistency, which is essential for panoramas and batch processing.

**WINNER: MAN**



AWB found it impossible to clear the colour cast in the green-filtered light of a forest



DIAL M FOR **MANUAL****CHALLENGE 17****Raw vs JPEG**

If you care about picture quality and you'd like to give yourself more flexibility when it comes to editing your pictures, then you need to shoot Raw. But there's a lot to be said for shooting JPEGs. Straight out of the camera, they're less noisy and have more punch. You can also print and share them much quicker. Raw files need an additional layer of processing. You can do this in-camera with compatible bodies, but the adjustments are limited. Still, we're sticking with Man+Raw files as the winner here. The creative, lossless processing options and increased dynamic range are too good to miss.

**WINNER: MAN****JPEG****RAW****CHALLENGE 19:  
MAN vs COMPUTER****BLACK & WHITE**

We put the Auto Grayscale Mix option in Adobe Camera Raw (and Lightroom) to the test. The result? A flat, grey image that, while a little uninspiring, is certainly ripe for further contrast adjustments. Changing the mix manually produces a much more striking shot at the Raw processing stage. However, significant shifts in the Grayscale Mix sliders can substantially increase noise and reduce smooth gradients in large areas of colour, such as the sky. So, overall we'd have to hand it to the software's more subtle choice...

**WINNER: COMPUTER****MANUAL****AUTO**

The Auto Grayscale Mix option makes for a good starting point for further monochrome adjustments

**CHALLENGE 18****HDR vs exposure blending**

In-camera HDR can be a bit 'Marmite' – you'll either love or loathe the results. But at least more recent EOS cameras, like the 5D Mark III, give you the option of saving the original, bracketed exposures as Raw files too, enabling you to do some good, old-fashioned blending in Photoshop. Cheating? A case of Man + Computer vs Camera? Well, at least we didn't use any dedicated HDR software...

**WINNER: MAN****MANUAL**

If you need HDR images quickly, then you'll have to use the in-camera option, but it's not as good as doing it manually

**THE VERDICT**

It's a pretty even match, but in the end Man beats Camera. It has to, or we're all doomed! There's no denying how some of the auto options can make your life easier though, and overlooking them in favour of the fully manual approach may be a little short-sighted. Auto ISO and AI Servo AF were the stand-out automatic options, delivering reliable results. But, even then, they still needed human input to bring them completely up to speed.

**11 MAN**  
**8 MACHINE**





# GREAT SHOTS WHATEVER THE WEATHER

*It doesn't matter if it's overcast, misty, stormy or chucking it down, landscape pro Tony Worobiec will help you take great scenic shots*



STEAMBOAT ROCK, UTAH, USA  
“Photographed just after a prolonged period of rain; those moments immediately after often produce the best possible lighting for landscapes”

Lens	Canon EF 24-105mm f/4L IS USM
Exposure	1/30 sec, f/16, ISO400

**W**hile we are all comfortable shooting landscapes when the weather is favourable, we should also be aware of the excellent opportunities that exist when it's more challenging.

It helps to develop an open-minded approach to the potential for taking great photographs, irrespective of the weather. Adopting the right mental attitude is important. When you look out in

the morning and see that it's raining, don't leave your Canon DSLR at home, instead it should be a time to celebrate some great photo ops. When you arrive at a location and discover that it is shrouded in thick mist, ponder your good fortune. While travelling to a location you had long planned to photograph, you notice the sky is beginning to fill-in, just think of the wonderful opportunities this changing weather presents.

It's so easy to dismiss the ambient weather conditions as

'ordinary', but no such thing exists. While I'm perhaps labouring this point a little, if you are able to adopt a positive view of weather, your landscape photography will become more interesting and fulfilling. It really is disappointing to hear fellow landscape photographers complain that the weather had not been kind to them. Weather determines the 'mood' of the landscape, and the more demanding the weather conditions, the more interesting our photographs become.



BURNHAM, MONTANA

"Shot at the tail-end of a tornado, these dramatic mammatus clouds appear to dwarf – and even threaten – the small white school on the prairie"

Lens	Canon EF 24-105mm f/4L IS USM
Exposure	1/200 sec, f/10, ISO640

# Learn to love stormy skies

Discover crucial Canon DSLR skills for shooting brooding clouds and threatening thunderstorms

**B**y introducing weather into landscapes we can promote a heightened sense of mood, and this is particularly evident when photographing stormy skies.

The best photographs evoke an emotional response, something a threatening sky is particularly capable of suggesting. It sometimes helps to step outside photography and consider how others have chosen to interpret weather. Renowned for his seascapes, it is alleged that, prior to painting *The Fighting Temeraire*, J.M.W Turner had himself strapped to the masts of a ship during a particularly fierce storm. While I am not proposing that we photographers go to quite such lengths, being prepared to experience the power of a storm

gives us a better understanding of the subject we are photographing.

## How do thunderstorms form?

Storms are created when an area of low pressure is created within a surrounding area of high pressure, resulting in rapidly rising clouds. The surface of the earth warms up, in turn warming the air directly above the surface. This causes the air to rise and the colder air above to sink, stimulating a process

**It is alleged that J.M.W Turner had himself strapped to the masts of a ship during a particularly fierce storm**

known as convection. The warmer the air, the higher it rises, creating amazing cumulonimbus clouds.

## Which subjects for stormy skies?

Clearly any landscape will work, although some work better than others. If a cloud formation is especially dramatic, make it the main subject, with the foreground playing a secondary role; in these circumstances lower the horizon within the frame when shooting. A landscape scene with a fairly uninterrupted horizon often works well. If you include a figure within the composition, ensure it looks small in relation to the sky. If there is a strong wind, use it to enhance the scene; long hair or loose clothing billowing in the wind will all heighten the sense of drama.



01

The wild sea crashing over Pulpit Rock, Dorset, looks dramatic, but take care of your camera kit



02

The subtle colour of the receding tide complements the dramatic sky in Dingle, Ireland



01

### Keep spray at bay

If photographing by the coast in stormy weather, take measures to ensure your camera is protected from sea spray, which can wreak untold damage; the back of the camera is at most risk. In this situation I used my body as a shield.

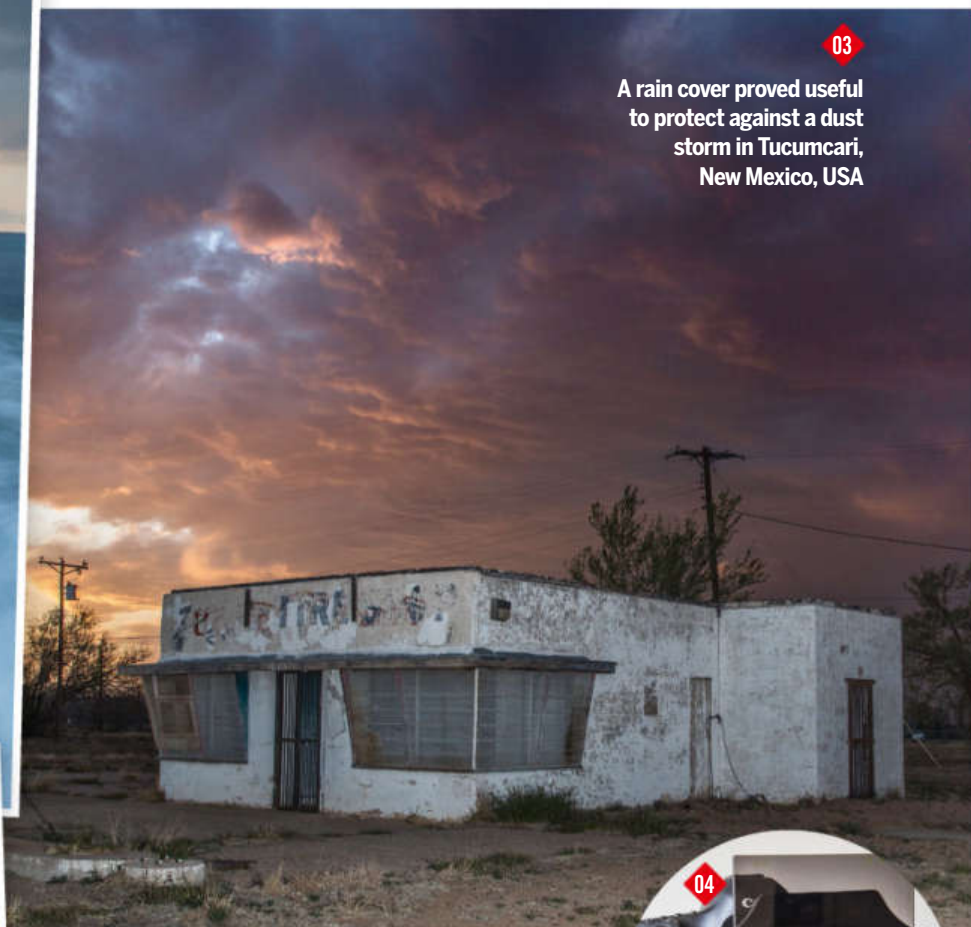
02

### Grey skies or colourful clouds?

When photographing stormy weather, you have various options. If you shoot in the middle of the day, the clouds will appear grey, so in order to introduce cohesion, make sure the foreground has a similarly restricted colour palette. An alternative is to take your photographs at dawn or dusk, when the sky appears extraordinarily colourful.

03

A rain cover proved useful to protect against a dust storm in Tucumcari, New Mexico, USA



04



03

### Guard against the elements

Be aware of how damaging dust can be. When photographing this on-coming dust storm, I had the presence of mind to place a rain cover over the camera; just as well because moments after taking this shot I was engulfed in an almost impenetrable cloud of dust.

04

### Balance bright skies

Use a graduated filter; these allow you to balance the exposure of the foreground with a potentially much lighter sky. The main manufacturers of these filters are Cokin or Lee. If the sun is at 90 degrees, you might experience an unevenness of exposure across the sky; if so then angle the graduated filter horizontally.

Even a dark and foreboding sky will be brighter than the land, so use an ND grad

The menacing clouds suit the Gothic feel of Whitby Abbey

05

### Match the landscape

As Whitby Abbey is the alleged inspiration for Bram Stoker's *Dracula*, it is only fitting that it should be photographed under a 'threatening' sky. One of the most important considerations, when photographing the weather in a landscape, is to match the sky with a suitable foreground.



## GRAIN SILOS, SOUTH DAKOTA

"Shot just as the light was breaking directly behind me, the grey, brooding sky adds interest to the line of silos"

Lens	Canon EF 24-105mm f/4L IS USM
Exposure	1/250 sec, f/18, ISO400

# Develop grey-sky thinking

Don't be put off by dull weather – a bland sky doesn't necessarily translate to a dreary photo!

**T**he phase 'grey sky' conjures a certain negativity; many of us complain of days when we are deprived of sunshine. It is easy to get depressed under constant grey skies, yet there is a positive side to this weather.

The first thing to understand is that the term 'grey skies' covers a multitude of weather conditions, ranging from a thick, impenetrable cloud to a gentle scattering in an otherwise blue sky, and each presents its own unique opportunity. My own take is to recall a quote by the motivational speaker Paul F Davis: "The sun always shines above the clouds."

So, what are the positives?

**A) LAYERS OF CLOUD** helps to reduce contrast. When using a modern DSLR camera, while it will

have many assets, one of the main drawbacks is that the images are prone to appear too contrasty, especially in strong sunlight. This is rarely a problem in overcast light. Seasoned photographers often refer to such weather as 'the softbox in the sky'. Should you wish to photograph a portrait or a figure out doors, the result are far more flattering under a grey sky.

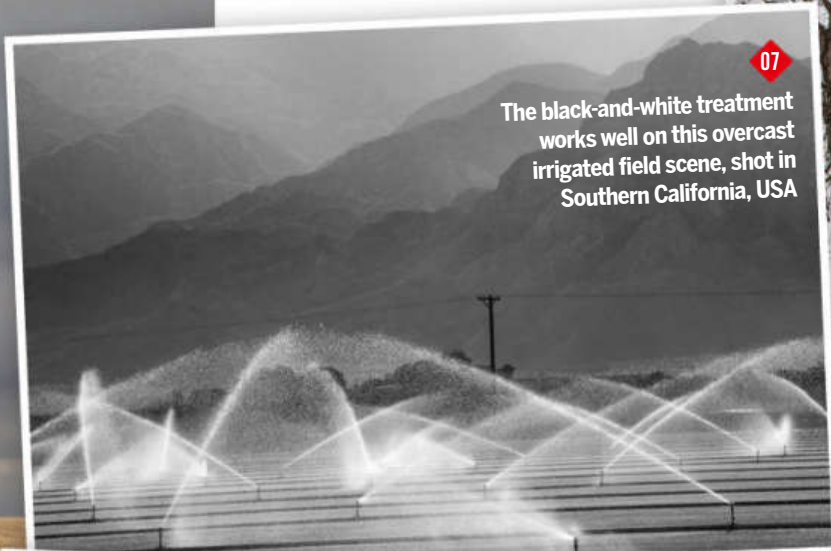
**B) GREY SKIES** evoke a mood that works well in certain landscape situations. While we all respond to the picturesque landscape, with experience we want to explore new avenues, capturing landscapes that express pathos and sadness; such scenes are complemented by a dark sky. One of the challenges, when shooting landscapes, is to ensure that the sky appears sympathetic to the mood of the picture.



Select the Cloudy white balance setting to reduce colour casts on overcast days

**C) LANDSCAPES** taken on a cloudy day often work well in black and white. By eliminating colour, while emphasizing the tonal values, the mood of the landscape becomes considerably more apparent. Shoot in colour and convert to black and white with your favoured post-processing software to retain full image quality. A variation is to retain your image in colour, but to purposefully reduce the saturation; such images can look stunning.





**07** The black-and-white treatment works well on this overcast irrigated field scene, shot in Southern California, USA



**08** Thick cloud enables the sun to feature behind the abandoned grain elevator, in Madoc, Montana, USA

06

### Set the right white balance

When including a grey sky in your landscape, it is essential that it appears free of colour cast; to ensure this happens, you need to select the correct white balance. The AWB option is remarkably reliable, but if you want to make sure, select Cloudy, which accurately measures 6000 Kelvins of light, typical of an overcast day.

07

### Emphasize the tones

In overcast light the emphasis on your images should be tonal; whether you retain your image in colour, or decide to convert it to black and white, the tones communicate a mood. Achieving this in bright sunlight would have proven difficult.

08

### Shoot into the sun

Grey skies provide a rare opportunity where you are able to include the sun within the composition, without encountering underexposure. As it remains thinly veiled by cloud, it offers a much needed feature within an otherwise blank sky.

**If the sky really is dreary, simply omit it altogether**



10

09

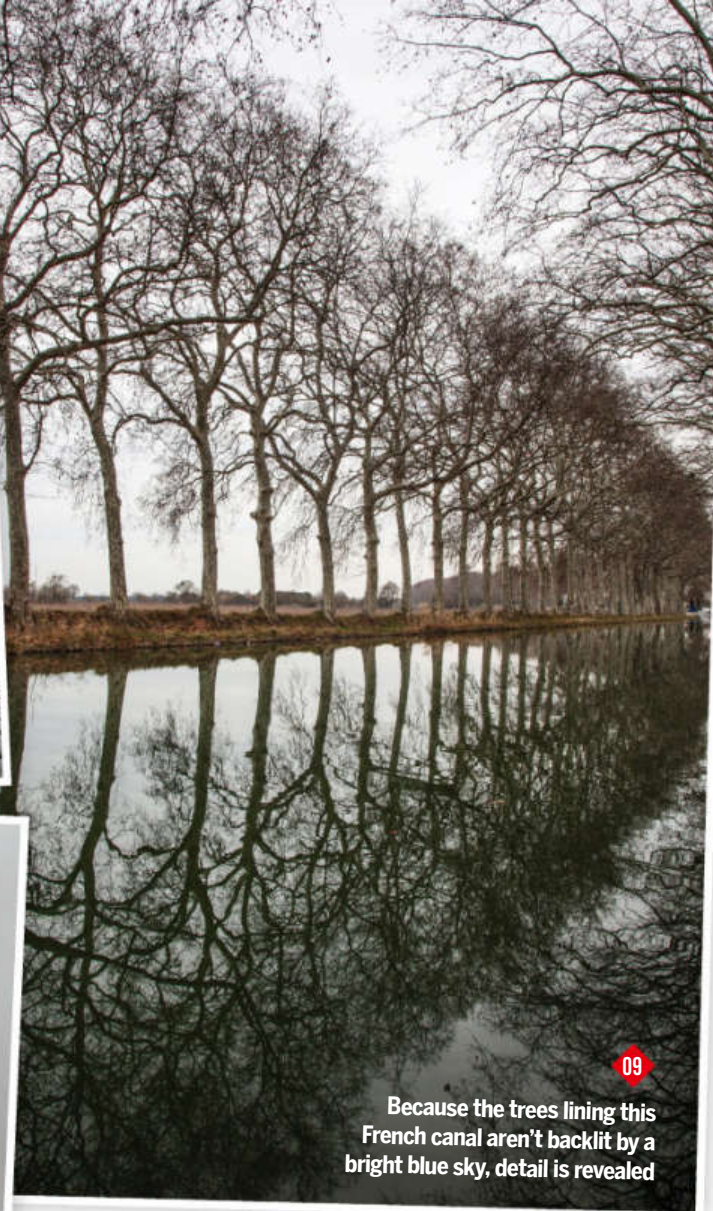
### Reveal hidden details

If I had viewed this delicate tracery of trees set against a blue sky, much of the detail would have been lost. Seen against a very pale grey sky, the simple beauty of these trees becomes immediately more apparent.

10

### Exclude featureless skies

Don't always feel compelled to include a sky when shooting landscapes; often the image can appear much improved without it. In this forest photo, the sky was flat and featureless and would have added very little to the image.



09

Because the trees lining this French canal aren't backlit by a bright blue sky, detail is revealed





11

Even pro DSLRs like the 5D Mk III need protection against a downpour



12

Rain drives crowds away, giving Penarth pier a desolate feel



## Just shootin' in the rain

Even when it's hammering it down there are plenty of fantastic photo ops to be had

**I**n common with grey skies, rain comes in many varieties, from drizzle right through to a full-blown deluge, and each offers unique opportunities for photography. However, not only is it desirable to keep yourself dry, but also your camera. It is difficult to muster the enthusiasm once you are drenched, but on a similar tack DSLRs are vulnerable to rain and can sustain damage if they are not adequately protected.

**A) DRIZZLE** is the lightest form of rain and relatively easy to work in. The droplets of water are smaller than raindrops and it can often be confused with mist. The ground will appear wet, although in light drizzle, the water can evaporate quite quickly.

**B) THUNDERSTORMS** are considerably more violent and, while they are difficult to work in, present excellent opportunities for original photography; partly this is because so many photographers are not willing to work in such challenging conditions. They are created by the formation of cumulonimbus clouds and are frequently associated with thunder and lightning. They can occur at any time of the year but are more common in late spring and

**Thunderstorms are violent and, while difficult to work in, present excellent opportunities for original photography**

summer, particularly during the afternoon and evening.

**C) WIND & RAIN** creates one of the most difficult conditions to work in, particularly if the direction of the wind fluctuates. It is possible to work with your back to it, but it has an irritating habit of changing direction. But if you're prepared to brave the elements, there are great opportunities to be had.

**D) STEADY RAIN** is possibly the easiest condition to work under, and one which offers the best results. The secret is to look to the ground, as the reflections and enhanced colour saturation open up all sorts of creative possibilities. Free of wind, you should be able to work quite comfortably providing you take precautions as follows...



# RAINY DAYS

SWANAGE PIER, DORSET  
 “I wasn’t prepared for this shot, but it was too good to miss, so I took it with just my lens hood for protection – fortunately, I got away with it”

Lens	Canon EF 24-105mm f/4L IS USM
Exposure	1/60 sec, f/14, ISO800

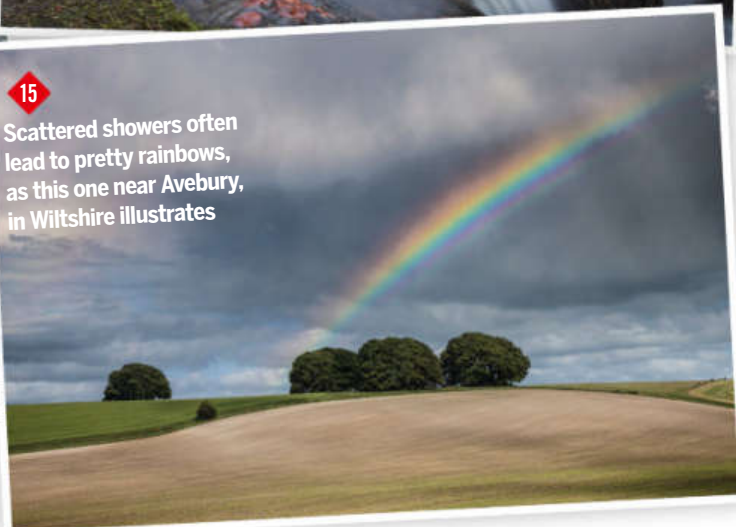
14

Rain has made the swollen Scalebar Waterfall, Yorkshire, more photogenic



15

Scattered showers often lead to pretty rainbows, as this one near Avebury, in Wiltshire illustrates



14

## Rain means flowing rivers

If you are in a rural setting, don't overlook the opportunity to photograph flowing water; cascades and waterfalls often look at their most photogenic when it's raining. Moving water is best photographed when using a slow shutter speed; try between 1/4 and 8 seconds to achieve that silky-smooth effect.

15

## Over the rainbow

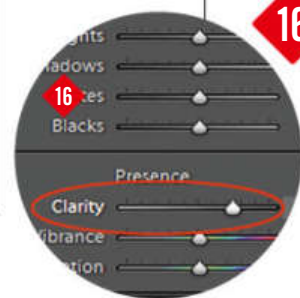
On showery days, rainbows appear immediately after rain. Think carefully where you want the end of the rainbow to be positioned. From a compositional standpoint, it can be used as a glorified lead-in line. Look for a tree, or possibly a building, to use as a focal point.

16

## A little clarity

Some images shot in rain can lack contrast, particularly in the midtones. Whether you are using ACR, Lightroom or Photoshop, this can easily be overcome by increasing Clarity of your Raw images. Push it to the right and watch those midtones suddenly come alive.

Whack up the Clarity to add punch to rainy shots



13

Rain reflects the drizzle at this retro motel in New Mexico, USA



11

## Get a rain cover

Most, if not all cameras can withstand the odd drop of rain, but few can withstand a prolonged downpour. Buy purpose-made plastic units to fit over your camera and lens.

12

## Pier-pressure

Piers are ideal rainy subjects, the wooden floors are reflective, plus they tend to be deserted. If you're able to shoot them in low light or at night, an otherwise prosaic subject can look stunning.

13

## Night lights

The urban environment provides fabulous opportunities in the rain, particularly at night. You do not need a torrential downpour; in the above shot there was just a light drizzle, but it was sufficient to offer a reflective surface for the gaudy neon lighting.

## CORFE CASTLE, DORSET

"Mist and fog tends to be low-lying, so if you are able to find a higher vantage point, you are likely to be rewarded with fabulous opportunities for photography"

Lens	Canon EF 24-105mm f/4L IS USM
Exposure	1/50 sec, f/14, ISO400

# Make the most of mist

Discover why misty mornings and fleeting fog are a photographer's dream

**W**hile this article highlights the photo opportunities for landscapes in 'bad weather', to describe fog or mist as such is perverse. Even new photographers rise to the challenge when experiencing a typical pea-souper; it introduces qualities that cannot be seen under any other weather conditions.

**A) AS FOG** tends to considerably reduce colour saturation, a much stronger emphasis is placed on the tonal values. Images can be very successfully converted to mono.

**B) IN FOG** a visual phenomenon known as 'tonal recession' makes distant objects considerably lighter

than those nearer the camera. This is especially apparent in a forest.

**C) PHOTOGRAPHING** fog or mist at night captures images rich in atmosphere. Artificial lights are tempered, creating ethereal effects, and as mist swirls around, light rays are subtly distorted, creating dream-like scenarios. If the ground is wet, it is possible to capture beautifully subtle reflections.

**A typical pea-souper introduces qualities that cannot be seen under any other weather conditions**

**D) THE URBAN** landscape can appear especially interesting in mist. Traffic, only visible by dipped headlights, appears to amble through silent, monochromatic streets, offering strange and enigmatic photo ops. Buildings receding into the distance appear alarmingly unfamiliar. Consider those highly evocative movies of the 1940s and '50s to appreciate the potential this has to offer.

**E) LOOK FOR** subtle shapes; fog has the capacity to simplify forms and reduce texture, consequently objects, even those relatively close by appear almost silhouetted. From a visual standpoint a scene blanketed in mist undergoes a process of simplification.

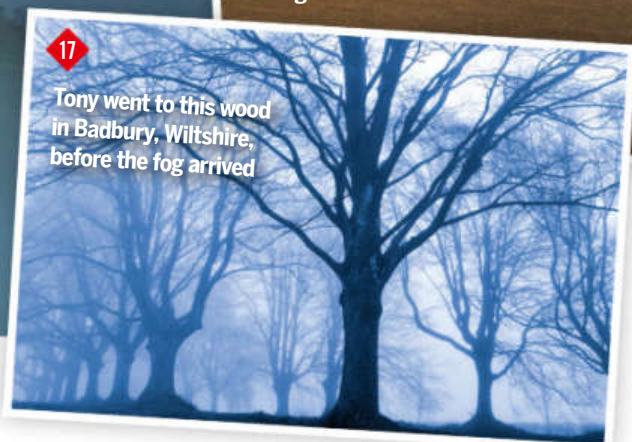


## MISTY &amp; FOGGY CONDITIONS



19

The layering effect of these hills in Granada, Spain is due to light mist in the air



17

Tony went to this wood in Badbury, Wiltshire, before the fog arrived

17

### Haven't the foggiest

Mists and fog are notoriously ephemeral; there is often little point looking for photographic opportunities during a period of fog as it will have disappeared by the time you find a suitable location. Scout them out prior to anticipated fog. Emphasize the mood by putting a warm, or as in our example, a cool filter in Photoshop.

18

### Compress perspective

Use a telephoto lens, such as a Canon EF 100-400mm zoom, in order to maximize the effect of tonal recession. It also draws the foreground and background closer together. Although when lighting is low a tripod will be needed.



18

19

### A little perspective

These conditions provided the perfect opportunity to explore 'aerial perspective'; when moisture in the air creates the illusion of distant objects appearing to get lighter the further they are from the camera. This visual phenomenon becomes particularly apparent when using a telephoto lens with 2x extender for a focal length of 320mm; in this example, the distant mountains appear compressed, which exaggerates the effect.

20

### Increase the exposure

A problem you're likely to encounter is underexposure. The metering system in your camera is programmed to capture 18% grey, which means that your shots in fog are underexposed. The easiest solution is to select Manual Mode, then set the camera to overexpose by between 1/2 to 1 stop.

21

### Seen the mist, not missed the scene

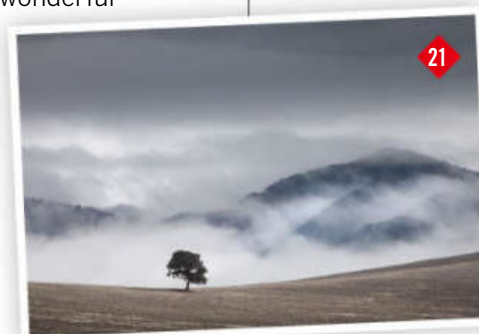
If you're near hills or mountains, be aware that fog can rise or fall depending on the ambient temperature, resulting in some wonderful photo ops. Try to identify single isolated features in the foreground, such as the tree in our shot, use that as your main focal point. Don't be afraid to shoot wide and show how small the tree is compared misty landscape.

20



Overexpose by up to one stop to overcome the effect of mist

Shooting wide emphasizes the lone tree being shrouded by mist



21





# MAKE CASH WITH YOUR CANON

Take your hobby to the next level with expert  
advice and success stories from the very  
best professional photographers



## MASSIVE EXPERT GUIDE

- Build a brilliant online portfolio
- Set up successful skills workshops
- Essential stock library secrets
- Discover your speciality
- Shoot the perfect wedding
- Sell your prints

**W**e'd find it hard to believe that any *PhotoPlus* reader first picked up a camera with the intention of turning it into a cash machine. In fact, we'd put money on it. We're in it for the art, escapism and enjoyment, right?

The thing is, photography can be an expensive business. All the travelling. All the shiny new lenses and accessories. Software, storage, prints... it can soon start to mount up. So, if you can use your camera to earn yourself some extra cash to splash on new gear, then why not?

Over the next 12 pages you'll find a comprehensive guide to getting started. We'll show you smart ways in which you can make money with your existing photographic portfolio, and how to shoot a fresh stock of images that sell.

We're going to be realistic too; don't expect to be inundated with commissions when you take your first steps into the world of freelance and semi-professional photography. Only a lucky few social media-savvy photographers can boast of 'overnight' success. In reality it takes time to build a name for yourself, as well as a collection

of cracking, commercial images. But it can be done. For instance, combining your other interests with your photography can put you ahead. Do you have an in-depth knowledge of fishing? Mad for martial arts? Have the hots for dogs? You're more likely to pick up sales if you're a big fish in a specialist pond. Don't overlook the opportunities close to home, either. Offering to shoot your company's corporate headshots or a local hairdresser's marketing photos may generate enough word-of-mouth to start the ball rolling. Turn over the page for more easy first steps...



**// Your web presence makes the biggest first impression with your potential customers //**

It will be easier to build a reputation if you specialize in the type of photography you love shooting, rather than being a 'jack of all trades'

# Get started today

You don't have to invest a lot of time to begin making cash from your photography – there are some simple steps you can take right now...

**W**hen you're setting out to make money from your camera, you need to keep your business head

**screwed on.** There's no need to splurge on new kit and you should avoid offering your services for free, otherwise clients will grow to expect it.

While business cards from the likes of Moo ([www.moo.com](http://www.moo.com)) give a professional touch, these days it's the state of your web presence that makes the biggest first impression with potential customers; it's essentially your shop window. It could be a simple online portfolio presented

alongside your contact details through to a fully-functional website and blog with private client area and browsable stock library with e-commerce facilities. As a minimum, you should have a web presence on photo-sharing sites such as Flickr and 500px, with a link to a Facebook page dedicated to your commercial photography interests.

The key is to make it easy to get in touch with you and to stay active. There's no point in starting a blog if you don't keep it updated; if the last entry was made in 2013, then the consensus will be that you can't be bothered. You don't need

to be too ambitious; topping up your blog once a month is perfectly acceptable for a dedicated photographer. But the more effort you put in, the faster your following will likely grow. If you can upload a picture a day, whether it's fresh and hot or one pulled from your archives, then you'll keep visitors coming back for more.

## Build a presence online

Be active on social media, too. The likes of Facebook, Google Plus, Twitter and Pinterest are your biggest marketing opportunities, and the bigger the fan-base you can build for your work, the greater the opportunity you'll have for making a sale. Remember internet etiquette: follow everyone who follows you, and 'interact' and strike up conversations rather than simply posting links to your own pictures.

You'll have to get your head around SEO (Search Engine Optimization) if you're going to start attracting large numbers of visitors to your site. Your pictures will be invisible to users

## USEFUL TO KNOW

Make sure that you have the necessary insurance cover. We're not just talking for your equipment, but public liability insurance. It covers you should a member of the public seek compensation for an injury or damage caused by your business activities – such as tripping over a tripod leg. Firms with bespoke plans for photographers include Aaduki ([www.aaduki.com](http://www.aaduki.com)) and Photoguard ([www.photoguard.co.uk](http://www.photoguard.co.uk)).



# MAKE CASH WITH YOUR CANON

searching for images online, unless you give them keyword-rich filenames and captions. Starting a blog through a popular service like Wordpress (<http://wordpress.com>) is a great way of bringing visibility to your portfolio, as you'll have scope for targeting keywords and phrases that you want to rank for on search engines like Google; such as 'best British landscape photography' or 'cool London photo prints'. You can be up and running with a 'responsive' Wordpress theme (which adapts your website to the dimensions of the device it's being viewed on automatically) in a weekend. There's a huge assortment to choose from, and plenty of gallery styles and commercial plug-ins with which to customize your website. You'll have to pay for the more advanced features, but the basic Wordpress package itself is free.

Once you're up and running with a website, you can start offering image licensing and print sales to the world. The majority of professionals also offer training in some form to supplement their commissioned work and print sales. This typically ranges from one-to-one tuition by the day, to group workshops and accompanied tours and holidays. Naturally, being an established name helps to attract bookings, but that



**You may not be equipped to run a group workshop when you're starting out, but one-on-one training is certainly an option**

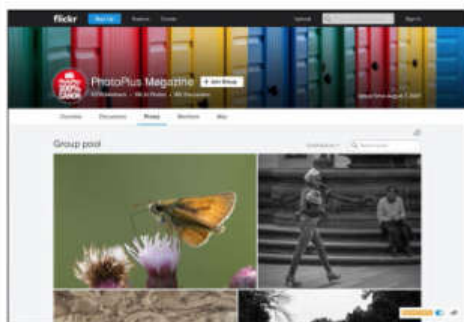


**Upload images to photo-sharing site 500px and you can make them available through its royalty-free sales licensing service**

shouldn't stop you from offering a training service on your local patch if you have a gift for teaching. "The most important lesson I've learned with running workshops is to try to cater for all levels of experience," says pro wildlife photographer Ben Hall. "Organizing and planning is also vital. I take clients to areas that I know well, or I do a thorough recce beforehand. Having a good knowledge of a location is critical."

If you're as confident in front of a camera as you are behind it, then starting a YouTube channel is another money-making and marketing option. Whether you're delivering a verdict on a lens, explaining a photography technique or providing a Photoshop tutorial, as long as you upload original content you can start to earn revenue from advertising.

And talking of videos, don't overlook the video function of your camera. Photo libraries are morphing into multimedia outlets, and being able to supply moving pictures as well as stills means that you can double your chances of making a sale from the same shoot.



**Flickr's a useful way of building a reputation and contacts – and to direct visitors to your website**



## PRO ADVICE

**David Newton**

[www.photopositive.co.uk](http://www.photopositive.co.uk)

Photographer and expert Canon tutor David Newton has steadily built up a reputation in education. He reveals: "I began training people who contacted me through a publication I wrote for and a forum I set up. That gradually caused work to grow by word-of-mouth. I built a website where people could get more information and contact me to book sessions; since then it has been a very organic growth. The training seminars and workshops I give for Canon at various dealers helps as this gets me in front of more people regularly. The best advice I can give is to find your own niche. My training is different to others as I don't teach creativity but concentrate on the camera kit – most people don't make the best use of what they've got. People go away having learnt something concrete about their camera that they can use in any situation. Be willing to share everything you know – too many people are precious about knowledge. If they don't learn it from you, they'll learn it elsewhere, so you may as well teach whatever you can. That way they go away happy and are more likely to come back, not to mention tell their friends about you."

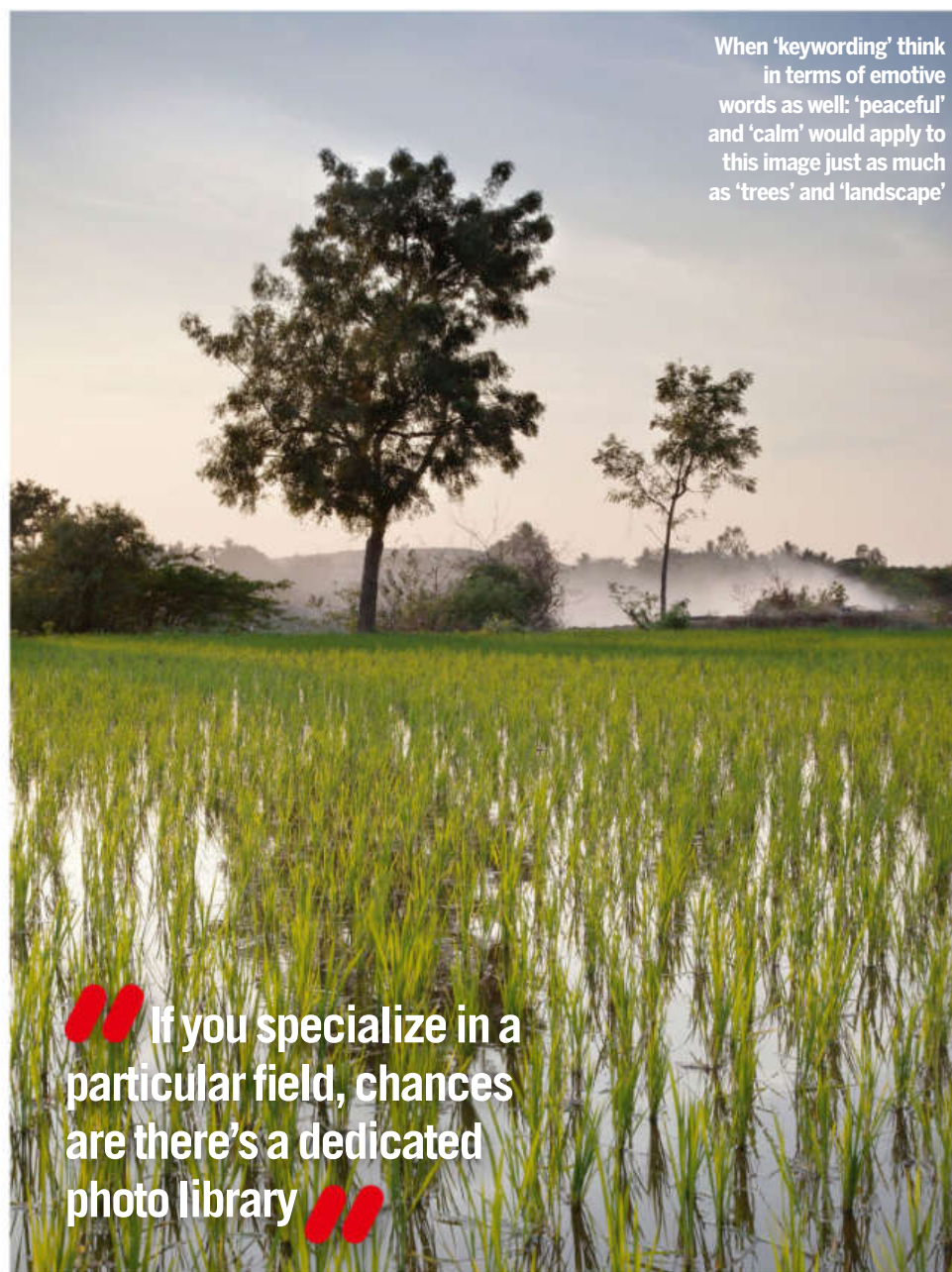
## DO'S & DON'TS

**DO...** make it easy for potential clients to get in touch – add an email address to all your online channels, as not everyone wants to fill out an online form to enquire about your work.

**DON'T...** forget to ask for endorsement from satisfied customers that you can use for marketing purposes.

# Making gains in the stock market

Do you have a brilliant back catalogue of commercial images? Able to spot trends and think laterally? Crafty with keywords? Then stock photography might just be your calling. . .



When 'keywording' think in terms of emotive words as well: 'peaceful' and 'calm' would apply to this image just as much as 'trees' and 'landscape'

**If you specialize in a particular field, chances are there's a dedicated photo library**

**T**he stock photography market may appear to have crashed, but having images available to buy online is still one of the few ways you can earn cash from your camera while you're asleep. Only a very few photographers can rely on it as a major source of income; you need to be committed and able to produce commercial work consistently to make a decent amount of cash.

There are three main routes for reaching clients: through a regular photo library, a microstock collection or your own website. To sell your pictures through a commercial photo library, you're likely to have to submit a batch of test shots before being accepted. For instance, Alamy – which claims to be the world's largest stock photo collection – requires four shots 'of varied subject matter' to evaluate for technical quality. Once you've passed this stage only a sample of pictures are checked in each subsequent submission – although the whole batch will be rejected if one shot fails to make the grade.

Microstock behemoth, iStock by Getty Images, requests just three samples of your work to check when you apply to be a contributor, while the submission process for Getty itself is much more stringent. It is the dominant force in worldwide premium stock, after all.

Of course, you don't have to approach the big libraries. If you specialize in a particular field, then chances are there's a photo library dedicated to supplying that type of image. For example, if you have an eye for wildlife photography, then a collection such as Nature Picture Library ([www.naturepl.com](http://www.naturepl.com)) will be more likely to attract the type of customer you're trying to reach. Smaller agencies will only want to represent your work if you

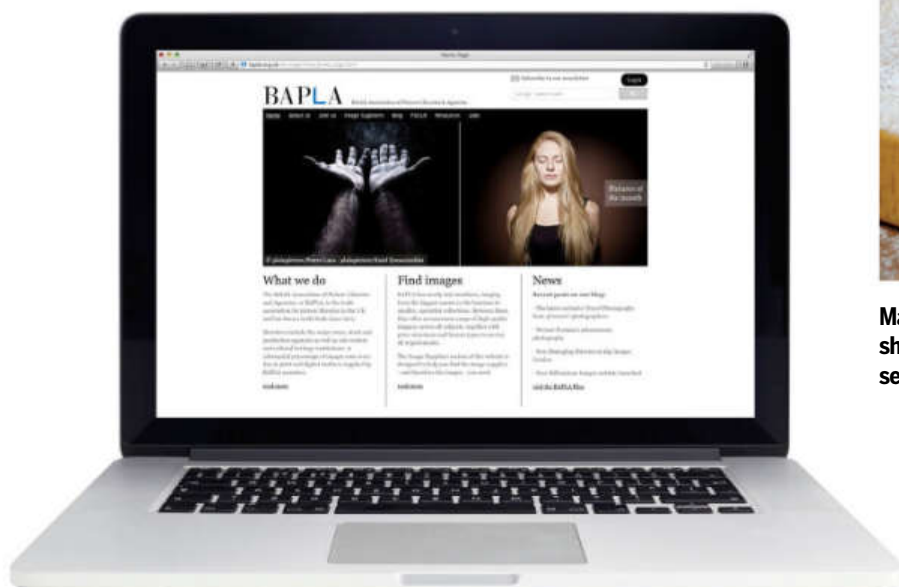


**Upmarket photo libraries, such as Alamy, have higher standards than 'microstock' libraries**

## USEFUL TO KNOW

One decision you'll need to make is the type of licence you want to apply to your work: rights-managed or royalty-free. With rights-managed photos, the client is essentially renting your image for a specific purpose. This allows the stock library to control where the image is seen and for how long. Royalty-free means the customer can, within reason, use the image where they want to, as many times as they want to.





**Make sure you upload seasonal shots well in advance of the season they're depicting...**

**The British Association of Picture Libraries and Agencies has links to large/small stock libraries at <http://bapla.org.uk>**

can offer a fresh approach or supply images they don't already have. Many publish a specific 'wants list' of images they're short of, and this can be a route in.

### Stock library cheats

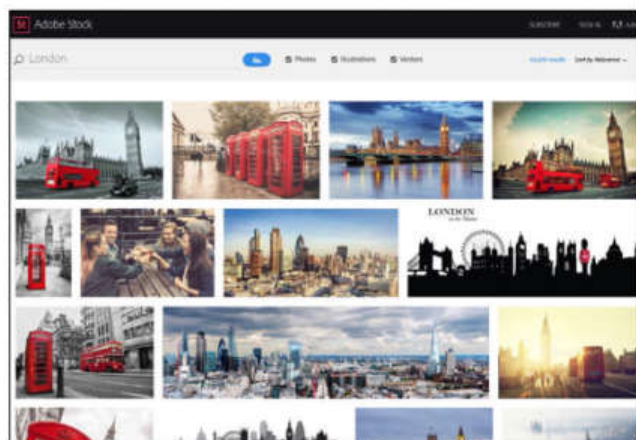
When it comes to submitting images to a stock library it pays to think in terms of concepts and metaphors rather than just uploading pretty pictures. What are the major national and international stories you could illustrate in a conceptual rather than literal way? Keep a running calendar of upcoming events for the next year or two that you could 'shoot to brief' for.

You will need to be meticulous when it comes to metadata. You'll need to add titles, keywords and captions to your images in order to make your image

visible within the thousands of other images in a commercial library. Think about the words and phrases that people are going to be searching for. Don't think simply in terms of descriptive words for the subjects depicted in a photo. Consider listing any photographic techniques, the type of camera or lens and any relevant conceptual descriptions, such as 'love', 'power' and 'growth'. And it is important to be relevant; any keywords should be clearly portrayed in the image rather than loose interpretations, otherwise you'll simply frustrate potential customers.

Think about the end use of your images if you want to maximize your potential for a sale, too. Magazine designers looking to incorporate image into a layout may be searching for pictures that have space for headlines and text. Make sure you always shoot a vertical shot too, as you increase your chances of an image being used on the cover of a magazine.

When it comes to the financial side of things, you'll need to factor in the commission that a library will take for each image sale. For instance, Alamy currently offers photographers 50% from every sale while iStock pays a basic rate of 15% for each file downloaded using its iStock Credits or Pay As You Go pricing, with that fee boosted to 45% if you become an Exclusive contributor. Microstock is cheap, though, so the amount of money you can make from each sale is considerably smaller than on a regular photo library – although you're likely to make a sale more often.



**Join the Fotolia library (<https://en.fotolia.com>) and you can sell your images through Adobe Stock, a service embedded in Adobe's Creative Cloud apps, such as Photoshop CC**



### PRO ADVICE

**David Clapp**

[www.davidclapp.com](http://www.davidclapp.com)

Photographer David Clapp has built up a successful stock photography business and explains: "My first contract in 2006 came from being spotted by a picture agent but a lot of this was done over the phone, which is the best way to progress all business. This helped me to refine my aims and head towards a commercial look that other companies and agencies could use. I began to research architectural agencies and travel agencies, building a portfolio to represent me. It's harder now, because microstock sites changed the value of rights-managed and royalty free-imagery. If you want to succeed then it is important to shoot subject-specific content. Most agencies will highlight what it is they are looking for. You can't just take the photos and think money will roll in. Diversity is the key, it takes time to refine your aim and build stock."

### DO'S & DON'TS

**DO...** get signed model and property releases for your stock images. You can download an example model release from the Royal Photographic Society website at [www.rps.org/learning/resources/downloads](http://www.rps.org/learning/resources/downloads).  
**DON'T...** include recognizable trademarks or copyrighted works as it's likely to be rejected by a library.

# Selling prints

Pictures on the internet come and go, but a good print can be enjoyed for a lifetime. Here's how to sell yours to an international audience

**S**cooping up Likes on social media is great, but it's hard to beat the satisfaction you get from someone choosing to buy one of your prints to hang on their wall.

When it comes to selling prints you can start small-scale and keep it local. You'll often find that coffee shops, restaurants and bars will be willing to display your images in return for a cut of the selling price. You'll have to offer them the prints on consignment. This means that you continue to own them until they're sold, at which point the retailer will split the revenue with you. This can be anywhere from 70:30 in your favour to a 50:50 share. Draw up a contract before you hand over the images. It should detail the prints, their retail price and how this will be split and paid, and which party will cover any damage while the pictures are on display, as well as the length of time they'll be on show. Typically, you'll have to collect any unsold photos between three and six months later.

Building up a relationship with a gallery is even better. You may have to work harder to convince them to display your work and the fee structure may be

**Putting on an exhibition is an obvious way of getting your prints out there**



Getting your work printed commercially will save you time, even if it doesn't save you money

more complex and potentially higher compared with using the walls of your local cafe. But you're likely to be able to charge more for your pictures, as well as getting your work in front of people who will be in a buying mood.

Putting on an exhibition is an obvious way of getting your prints out there, but you'll have to weather a considerable upfront cost. Printing photos and getting them mounted and framed doesn't come

cheap – stick with A4 size as this makes a big difference to the price – but it's worth getting it done professionally when you're putting on an exhibition or looking to sell through a gallery.

An alternative hands-on approach is to take a stall at a craft fair, a market or a local art event. Again, this is going to take a substantial initial outlay on your part, particularly if you're looking to offer prints, canvases, calendars and more.

## USEFUL TO KNOW

There are several ways to market photo calendars. You can print your own, but it's not easy to estimate how many you'll sell. A print-on-demand service like Calvendo ([www.calvendo.co.uk](http://www.calvendo.co.uk)) might be a better option, although you'll only get up to 30% of the revenue. Or register as a photographer with a calendar company such as Carousel Calendars ([www.carouselcalendars.co.uk](http://www.carouselcalendars.co.uk)) or Judges ([www.judges.co.uk](http://www.judges.co.uk)).



## MAKE CASH WITH YOUR CANON



Canon's PIXMA PRO-1 boasts gallery-quality A3+ prints in under three minutes, but at 2.3x1.5 feet and getting on for 30kg, it's a beast

Consider asking another photographer to get involved, as this will shave the costs and spread the risk, as well as halving the amount of work you have to do!

Of course, any freelance photographer worth their salt will offer picture sales through their own website. Doing this enables you to print on demand, reducing both your outgoings and your storage requirements. If you intend to print the images yourself, then you'll need an inkjet printer that offers high-res printing in the region of 4800dpi and is capable of churning out A3 borderless prints. You'll also need to factor in long-life ink and media to ensure your pictures will stand the test of time.

### Cut your costs

When you consider the running costs of such a printer – a complete set of inks for Canon's flagship £799 PIXMA PRO-1 will set you back almost £280, for example – as well as having to negotiate the minefield of calibration, printer profiles and test prints, then the higher price of getting prints made commercially can start to look acceptable. Using a reliable,



If you fancy selling a photo calendar without paying printing costs up front, Calvendo prints to order and takes care of transactions

high-quality commercial colour bureau locally will enable you to keep tabs on the quality and turnaround times, although that shouldn't put you off using an online photo lab, such as Loxley Colour ([www.loxleycolour.com](http://www.loxleycolour.com)) or Whitewall (<http://uk.whitewall.com>). Look for recommendations on forums or from professional photographers.

If that sounds like hard work then you can always create a website with a hosting company such as SmugMug (<http://smugmug.com>) that enables you to integrate photo lab ordering on your pages, so that you can offer wall art and gifts such as mugs, ceramic tiles and keyrings. You set the profit you want to make while they take care of credit card processing and fulfilment.

Websites like Fine Art America (<http://fineartamerica.com>) and Redbubble (<http://redbubble.com>) work in a similar way, offering a range of products that you can add your images to, while they take handle the ordering and customer care. Alternatively, if you're looking for place to sell your existing prints, you can try an Ebay-style arty marketplace like Etsy ([www.etsy.com](http://www.etsy.com)).



Smugmug enables you to create a website, upload your pictures and sell them to the public – and keep up to 85% of the markup

### DO'S & DON'TS

**DO...** ensure that images that will be viewed closely will print at a resolution of 300dpi at the size required.  
**DON'T...** assume that your monitor is displaying colours correctly. Calibrate it using a device such as Datacolor Spyder and use the correct printer profile.



### PRO ADVICE

**Geoff Scott-Simpson**

[www.geoffscottsimpson.com](http://www.geoffscottsimpson.com)

Nature photographer Geoff Scott-Simpson has taken the bold step of setting up galleries to sell his prints through. "It was my intention to open a series of galleries initially in the UK but, having moved to Spain in 2011, I decided on my doorstep would be a more sensible idea," he reveals. "Now we have two showroom galleries in Ronda and Gaucín, with a third gallery planned to open next March in Marbella. With so many people owning a digital camera and/or a smartphone these days and internet print services readily available, your pictures have to up there with the best and it's important to produce idiosyncratic work – only that way can you ever hope to sell. Depending upon your intended clients I would strongly advise to shoot local scenes. Living in a tourist area, our Gaucín gallery is all about scenes of the castle and view to Africa, while Ronda is about the town's world-class architecture and its culture. Above all, know your customers' spending ability. It's no good being overpriced and equally it's no good being underpriced. Collect email addresses, send out a monthly newsletter and be proactive."



**// Your first wedding is likely to be a nerve-shredding experience //**

# Shoot the perfect wedding

Shooting a wedding can be a daunting experience – there are no second chances if you take any duff shots – but everyone's got to start somewhere. Here's how to approach your first one...

**D**espite the proliferation of smartphones and on-the-spot social media sharing seen at the average wedding, the appetite for a professional photography doesn't appear to have diminished. Shooting a wedding is a rite of passage for many pros, and while the competition may be stiff, you can squeeze in the odd weekend wedding or two during the year without taking food from another photographer's plate.

Don't consider offering a wedding photography service unless you're totally confident you can handle it. Not only will you need to be brilliant with people, with the ability to usher a large group of people into the necessary positions, you'll also need to be on top of the technical side of things so you're not checking every single shot you take on the spot.

For a feel for what's expected, offer to shadow a full-time wedding photographer as a second shooter. You may even be able to use the pictures you produce to

promote your work. If you enjoy the experience then lining up your first job can be as easy as letting people at your place of work know about your talent, advertising in local press (or shooting a story for them for free in return for a plug) or creating a dedicated website.

As with any debut, your first wedding is likely to be a nerve-shredding experience. Digital cameras have made it mildly less stressful; instant playback, histograms and Raw files take some of the heat out of the white dress/black suit exposure conundrum. Don't underestimate how much editing you'll need to do, either. Pro wedding photographers typically offer anywhere up to 500 high-res pictures as part of the package, so you'll need to brush up on your batch-processing skills. Lightroom makes easy work of this, and enables you to quickly apply commercial-looking presets to the entire shoot.

You'll also need a decent range of kit, either bought, borrowed or hired. While it may be okay to shoot a hipster wedding

using nothing more than an iPhone, most Big Days will require wide-angle, standard and telephoto shots covered off. Pro wedding shooters can often be seen with the 'holy trinity' of Canon L-series zooms (EF 70-200mm, 24-70mm and 16-35mm) along with fast prime lenses that offer wide maximum apertures for working inside the dimly-lit church, registry office and for the evening do.

## Pro gear on a budget

You don't have to splash out on lots of expensive glass; you can always hire lenses to fill any holes you have in your lineup. Companies such as Lenses for Hire (<http://lensesforhire.co.uk>) offer a diverse range of rental EF lenses that can be delivered straight to your door. The trick is not to take so much kit that you spend longer thinking about which lens to attach to your camera than you do getting the shots. And there's also the small matter of turning a profit! Do make sure you hire a second camera body,

## USEFUL TO KNOW

The Society of Wedding and Portrait Photographers (<http://swpp.co.uk>) represents photographers in the UK and Europe. Membership ranges from £60 to £120, depending on your level of service, and there's a no-fee complimentary preview. As well as organizing seminars, competitions and a mentoring programme, it offers reduced insurance rates and the chance to advertise your services on its website.



MAKE CASH WITH **YOUR CANON**

Discuss with the couple what type of images they're looking for: Formal? Candid? Instagram-style filtered? This will determine your approach, both photographically and digitally

identical to your own Canon EOS, though. Not only will this allow you to carry two different lenses at once, but it'll be a backup should the worst happen with your main one.

As far as making preparations for the day, you'll need to meet with the bride and groom to discuss their requirements well in advance. Get a running order for the day and prepare a checklist of shots as it's easy to miss important little details, such as the bride's shoes and table decorations. Keeping these printouts in a lanyard will ensure you've got them close by for reference.

Ideally you'd visit the wedding venue ahead of time, too, so you can scout suitable locations and predetermine exposures. You can also find the best place to park; the last thing you want to do is get boxed in when you're trying to zip between locations.

The big question for many wedding photography newcomers is how much to charge. The answer really depends on the level of service you're prepared to offer. Prices from full-time pros typically range from £600 to £3000, with the higher-end of the scale reflecting a complete package of pre-wedding or engagement shoot, full-day coverage from preparations to the first dance, a luxury photo album and more. No matter where you pitch the price, your clients will expect the high-res

images. Some photographers also supply low-res images that can be shared on Facebook and other social media. Gone are the days when the photographer maintained total rights over the images, although you'll need to retain the rights to use images to promote your work.



**You'll need a range of top-quality optics and a second body – if you don't own them, hire them**

**PRO ADVICE**

**Victoria Grech**

[www.victoriagrech.com](http://www.victoriagrech.com)

Wedding photographer and filmmaker Victoria Grech explains: "I never intended to be a wedding photographer but after taking some additional images at a friend's wedding, who hated her professional photographer's work, my business was born. I shot over 50 weddings with as many photographers as I could to fully understand their style and how they interacted with their clients; I took the things I wanted my brand to embody and implemented those in my own business. Always putting the client first became my secret to success. I shot 52 weddings in my first year in business and ended up £16,000 in the red because I never learnt to price and run a business. The clear difference in successful people in our industry is to become a business owner in the photography industry rather than 'just' a wedding photographer. Mindset will set you apart from the rest."

**DO'S & DON'TS**

**DO...** consider getting some training with a reputable company such as Aspire Photography Training ([www.aspirephotographytraining.co.uk](http://www.aspirephotographytraining.co.uk)) if you're confident that wedding photography is an area you'll be committed to.

**DON'T...** forget to include the cost of hiring any lenses or lighting equipment required when costing out a wedding.

# Get your pictures published

Building a relationship with publishing houses can boost your income on a regular basis, especially if you can spin a few words to support your shots

**T**he monthly and weekly cycle of magazines means that they've traditionally been a good source of regular work.

But these days it's not just a case of seeing your pictures in print. The 'magazine experience' includes digital versions, websites, social media channels and international editions, all of which may be used to showcase your photos. Don't expect any fee you may receive to be increased exponentially, just bear in mind that your images are likely to reach a global audience, and a bigger market for potential future sales.

In the first instance, approach the magazine's editor or art editor with examples of your work. An email works best as your first point of contact. Keep it brief and attach five to ten low-res examples of your best images. Include a link to your website or your pages on photo-sharing websites such as Flickr or 500px, should they want to see more of your portfolio. Don't panic if you don't hear back the next day – the magazine team may be on deadline – but send a follow-up email if you haven't received a response within a week or two.

Seeing your work in print can be a reward in itself, and a great marketing opportunity should you get to plug your website or social media page. But the best way to earn some cash is to be able to provide words-and-images packages. Be honest with yourself when it comes to your writing skills: there's no point in pitching an extensive article if you break into a sweat stringing a photo caption together. But some recent examples of blog posts you've written may help to convince a commissioning editor to take a punt on you.

You should always retain copyright for 'stock' images that you have on file, and agree a fee for licensing these pictures. It can be slightly different if you've been commissioned to shoot images for a magazine and they've covered all the necessary costs, such as travel expenses,

Do you have interests outside of photography? Pets? Gardens? Cakes? Why not approach specialist magazines in that field?



## USEFUL TO KNOW

The Freelance Photographer's Market Handbook is a useful resource of contacts at British publishing houses. It also lists picture agencies, greetings cards companies and other photo-buying markets. It's published by the Bureau of Freelance Photographers ([www.thebfp.com](http://www.thebfp.com)), an organization that offers advice, a monthly newsletter highlighting potential opportunities and a copy of the book for an annual fee of £54.



## MAKE CASH WITH YOUR CANON

## Seeing your work in print is a reward in itself, and a great marketing opportunity

model fees and location hire, in which case you may be asked to hand over or share the rights to the images. You should agree all these terms up front and ask questions if you need anything clarified.

Book publishing is another area where you can combine your pictures and words for financial benefit. Depending on your level of ambition, you can try everything from producing a short run of books through a local printers and selling them through your website, through to pitching for a commission from an established book publishing company.

### Do it yourself

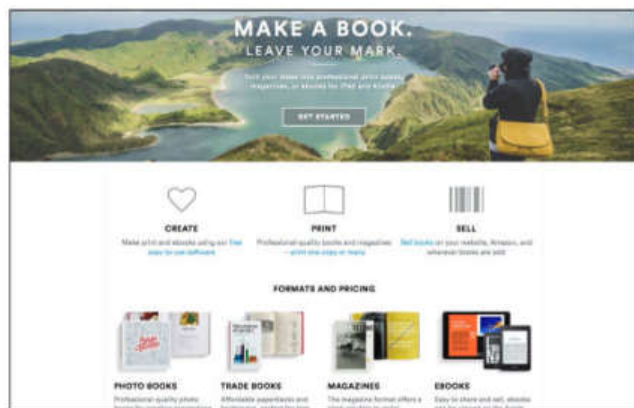
In between these two extremes is the self-publishing route. Online book-publishing services such as Blurb ([www.blurb.co.uk](http://www.blurb.co.uk)) or Bob Books ([www.bobbooks.co.uk](http://www.bobbooks.co.uk)) are geared up for the complete process. Not only do they provide design tools and templates to help you create your book, they also offer an online bookshop where you can sell your printed title. The advantage here is that you don't have to stump up for any copies as they're printed on demand. Blurb goes a step further: not only is its service integrated into Lightroom, but it enables you to sell your books through Amazon, the Apple iBook store and beyond.

If you're looking to sell to print publishers, remember to take at least one picture that has space to drop text over the top



Self-publishing in this way allows you to set your mark-up for each book. You'll need to factor in any charge that a retailer will make for selling your book, but don't forget to include costs associated with the book's production, such as the time it took you to take the shots, process them and put the book together.

If you find that including all these costs will make the book you want to produce prohibitively expensive for customers, then try the crowd-funding route. Kickstarter ([www.kickstarter.com](http://www.kickstarter.com)) always has a diverse range of photography book projects looking for backing. By asking others to donate to your book project, you can cover costs such as professional design and proofreading, as well as the printing fees. You can ask for pledges as low as £1 and beyond £100, but bear in mind that it's customary to offer the biggest sponsors a signed copy of the book and a credit inside. You'll also need a thick skin if you choose crowd-funding, as you may not hit the figure you've set as a goal.



Blurb offers a print-on-demand service for books as well as offset printing for large orders, and can handle fulfilment, too



### PRO ADVICE

Sara Melotti

[www.saramelotti.com](http://www.saramelotti.com)

Based in New York, Sara Melotti is an advertising and fashion photographer who works with clients and magazines. She says: "The secret to getting clients is to do a lot of legwork. I send a lot of emails every month to either introduce my work to potential clients or to remind them of it – persistency is key! Don't let rejections bring you down; in any creative job you'll be constantly facing rejections, even when you're established. Believe in yourself but be modest and keep learning. When I approach magazines I email the editor or fashion editor and introduce them to an idea I am planning on shooting – if my idea fits the upcoming theme of the publication they will issue me a commission letter that allows the stylist to get the clothes needed for the shoot. One important thing to keep in mind is that there isn't much money to be made in editorial – which is unfortunate because editorial is where the fun is! The real money lies in advertising..."

### DO'S & DON'TS

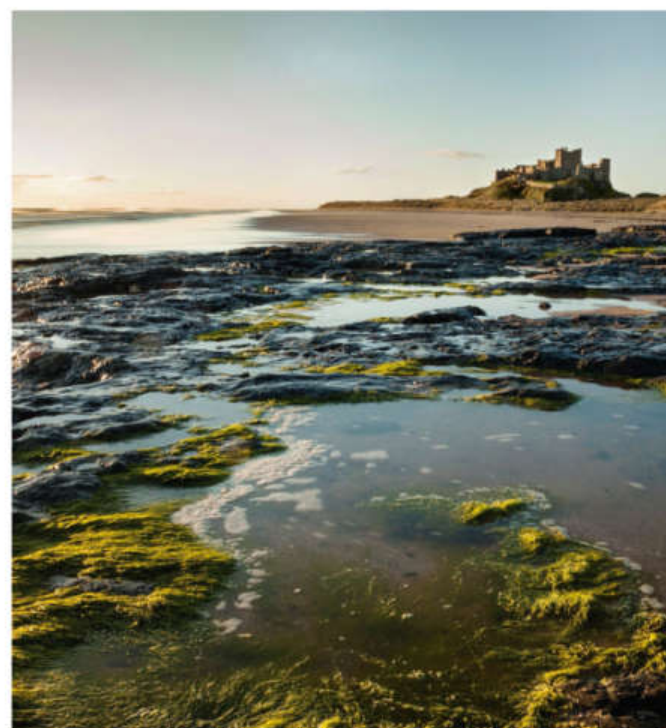
**DO...** consider the schedules magazines work to. There's no point submitting autumn/fall pictures in October, as magazine teams will be planning their winter issues, so this year's shots will be more likely to appear in next year's publications...

**DON'T...** blanket-bomb magazines with the same pitch; editors are unlikely to use you if they see your images duplicated in a rival publication.



# Projects

Hyper-real HDR	56
Polarized opinions	60
Music to your eyes	62
Let there be light!	66
Hyperfocally speaking	70
Create brilliant black & white images	74
In-flight entertainment	78
Shoot in the sea	82
Make the time fly	84
Mad hatter's tea party	88

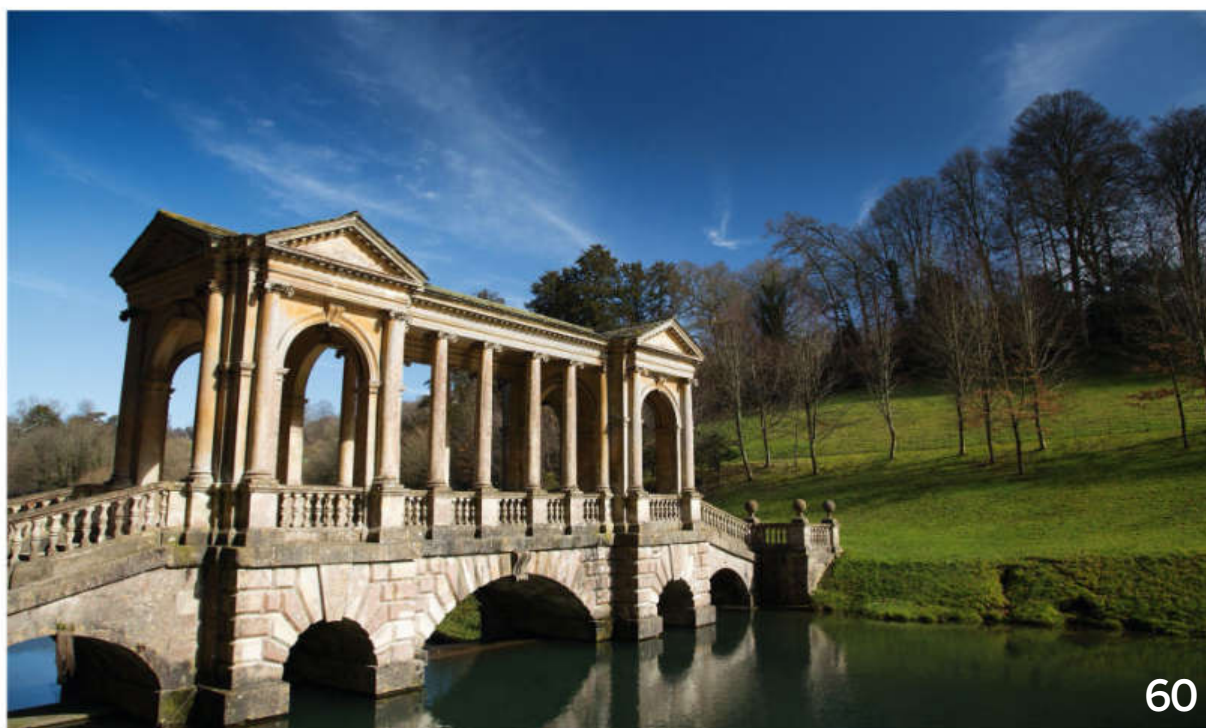




88



70



60



## PROJECT 1

## THE MISSION

Create HDR images in-camera with Canon's HDR Mode

## Time needed

One hour

## Skill level

Easy

## Kit needed

Canon DSLR with HDR Mode; EOS 70D, 6D, 7D Mk II, 5D Mk III (or later)  
Tripod (optional)

# Hyper-real HDR

Get the best out of Canon's recent built-in HDR feature as we explain how and when to use it to extend your DSLR's dynamic range

**N**ewer Canon DSLRs offer a built-in HDR mode that merges three exposures in-camera. This enables you to tackle a variety of high-contrast scenes head-on by extending the camera's dynamic range, which means you can record detail in the brightest highlights and darkest shadows.

It's a handy feature that adds another weapon to your creative arsenal, whether you shoot

'serious' HDRs, or are just after a fun effect while out and about.

The HDR Mode takes three bracketed exposures. All you do is press the shutter and the camera fires three times continuously in quick succession. There's no need to hold the shutter or set a Drive mode (although a fast drive mode will mean shorter gaps between shots). Then it takes about ten seconds to merge the frames and produce the finished HDR image.

You wouldn't expect the in-camera HDR Mode's to match

dedicated software, but there are several useful settings and a surprising degree of control. You can decide the difference in stops between the three frames, and choose from five different 'Effects' modes for a variety of HDR looks.

The original frames can be shot in Raw (or JPEGs on some DSLRs like the 70D), but the merged HDR is a JPEG. You can keep the originals (not on the 70D) so, if you're unhappy with the result, you can always process the images later with HDR software.



## WHAT IS HDR?

High dynamic range imaging is a technique that allows for greater dynamic range than a camera could achieve in a single frame. Simply put, it combines detail from the brightest and darkest parts of a scene, without having to sacrifice one for the other. To shoot for HDR, you need three or more exposures at incremental differences, so all parts of the scene are correctly exposed across the range of frames. The files are then merged and 'tone-mapped' to reveal detail, add contrast and create a hyper-real HDR look.

## STEP BY STEP SET UP YOUR DSLR FOR HDR

The HDR Mode menu has several features to control the look of the merged image



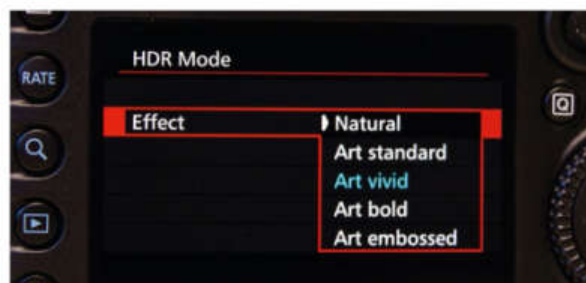
### 01 SET DYNAMIC RANGE

Go to the HDR Mode menu. By default, it's set to 'Disable HDR'. Switch to any other setting to enable HDR Mode. Choose a dynamic range to set the difference in exposure, from Auto or 1-3 stops.



### 03 AUTO IMAGE ALIGN

Even those with the steadiest of hands will find it hard to shoot three frames handheld that are in perfect alignment. The Auto Image Align feature can help by fixing slight differences between frames.



### 02 CHOOSE AN EFFECT

Give your HDR one of five looks with the Effect menu. These range from Natural, which produces a flat-toned result with subtle extra detail, to Art Embossed, which creates a desaturated embossed look.



### 04 HIGH DRIVE SPEED

The camera will fire three times when you hit the shutter. To minimize any effect of movement in the scene shoot the sequence as quickly as possible, so set your Drive mode to High-speed Continuous.



## IN-CAMERA HDR



## ESSENTIAL CAMERA SKILLS TOP TIPS FOR HDR

**01 USE A TRIPOD**

For precise alignment between the frames, use a tripod to keep the camera steady. A cable release and mirror lockup also help to prevent movement. Turn Auto-Align off, as it crops the image.

**02 STEADY HANDHOLDING**

When handholding, turn on Auto Image Align. This works surprisingly well, but it still pays to keep your camera as steady as possible. Lock your arms, breathe out, and hold still while shooting.

**03 FRAME LOOSELY**

If you shoot handheld then be aware that, with Auto Image Align enabled, the processed JPEG will be cropped in slightly. So take this into account when framing the shot and leave room around the edges.

**04 CAMERA SETTINGS**

The feature takes some control out of your hands. Whichever mode you're in, even Tv, the aperture stays constant while the shutter speed varies; this prevents changes in depth of field between the three frames.

**05 AVOID MOVEMENT**

Watch for movement within the frame as this'll ruin the effect, resulting in ghosting or messy edges. Ask people to stay still, wait until the wind drops, and avoid moving foliage like long grass or leaves.



# SELECT AN HDR EFFECT FIVE DIFFERENT OPTIONS

Choose from one of five HDR Effects for a variety of looks, from the subtle to the hyper-real



## CHOOSING DYNAMIC RANGE

The Dynamic Range setting enables you set the difference in exposure between the three frames. There are four options: Auto,  $\pm 1$  EV,  $\pm 2$  EV and  $\pm 3$  EV. From an angle like this, where the objects in the foreground are in deep shade, a single exposure couldn't possibly record detail in both the rocks and the sky. A  $\pm 1$  stop dynamic range begins to introduce detail, but a  $\pm 3$  stop range results in a lot more cloud detail and is more obviously an HDR image.



### 01 ORIGINAL IMAGE

Straight out of camera, a single frame struggles to record detail in either the sky or the foreground in this high-contrast scene. This is a good time to switch to HDR Mode and choose an effect.



### 02 NATURAL

Natural produces a flat effect, but with greater detail. There are a broader range of tones than you can initially see, so it's a good one if you want to apply local contrast or fine-tune the toning later.



### 03 ART STANDARD

Art Standard is slightly more stylised than Natural, with more aggressive toning to tease out detail in the highlights and shadows. It's a good compromise between subtlety and impact.



### 04 ART VIVID

In Art Vivid, the contrast and detail are similar to Art Standard, but as the name suggests, it pushes the colours more, so it's a useful one if the colours in the scene are lacking impact.



### 05 ART BOLD

Art Bold applies greater contrast and pushes the detail further than Art Vivid or Art Standard, but can lead to unattractive haloes along edges, particularly in busy scenes like this.



### 06 ART EMBOSSED

Art Embossed reduces colour saturation so that midtones appear greyed out, while edge details are enhanced. It's the least useful of the effects, but may work on grungy interiors.



# SOFTWARE PROCESS HDR ON YOUR PC

Unhappy with in-camera HDR? Process the originals in dedicated software



## 01 PRESERVE THE ORIGINALS

On most Canon DSLRs, you can choose to preserve the three original images shot in HDR Mode by setting Save Source images to All Images. This gives you the option to process them later in HDR software if the in-camera HDR isn't to your liking. Be sure to shoot in Raw for maximum tonal detail.



## 02 USE PHOTOSHOP HDR...

To use Photoshop's Merge to HDR Pro command, go to File>Automate>Merge to HDR Pro. Once loaded, use the Highlights and Shadows sliders to control the tonal range and the Detail and Radius sliders to give it the HDR look. The presets in the dropdown can be a good starting point.



## 03 ...OR THIRD-PARTY SOFTWARE

Photoshop isn't the only option. Many HDR enthusiasts use dedicated software, such as Nik HDR Efex Pro (pictured), Photomatrix Pro or 32 Float, which have many more presets for fine-tuning the HDR look. These either act as Photoshop plugins, or standalone software.

# CONTRASTING VIEWS GOOD & BAD HDR SUBJECTS

The greater the dynamic range of a scene, the better a candidate it is for the HDR treatment

**THE** distinctive HDR look – with edge haloes, saturated colours and grungy details – can be applied to almost any subject, depending on personal taste. But using HDR techniques more subtly as a utility (in other words, extending dynamic range beyond the limits of a single exposure) is most effectively applied to high-contrast scenes. Typical scenarios include landscapes at sunset with a dark foreground, subjects in shadow with their back to the sun, and gloomy interiors with bright windows. Scenes that work less well include flat, cloudy landscapes, subdued low-contrast subjects, and any scene with movement, like grass or people.



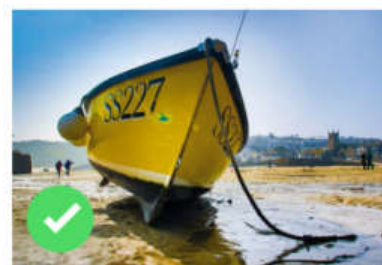
## INTERIORS

Interiors with windows work for HDR due to the big difference in light levels between the inside of the building and the outside world



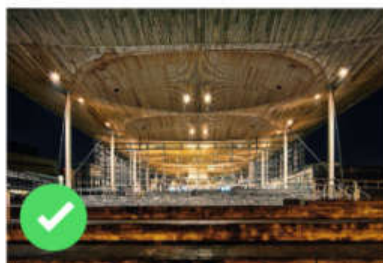
## CARS

Shiny metallic surfaces offer a good opportunity to push the HDR look further than you might go with a landscape



## SUNNY SCENES

In bright sunlight there's a big difference between highlights and shadows, which is ideal for the HDR treatment



## NIGHT ARCHITECTURE

At night there's a huge difference in brightness between artificial lights and the surrounding structures



## MOVING CLOUDS

When clouds are moving fast across the sky it might result in unsightly ghosting, jumps and jitters in the HDR process



## BLOWING TREES

Branches, leaves and foliage are fine in calm conditions, but not so good if it's breezy, so wait for a lull in the wind

## PROJECT 2

AFTER



BEFORE

## THE MISSION

Learn to use a polarizer filter for punchier skies and to cut reflections

**Time needed**  
30 minutes

**Skill level**  
Beginner

**Kit needed**  
Circular polarizer • A bright, sunny day with a blue sky and fluffy, white clouds

# Polarized opinions

Learn how attaching a polarizing filter to your lens can completely transform blue skies in your landscape shots

**A circular polarizer is one of the most useful filters you can buy for your Canon DSLR as its unique effects simply can't be replicated in Photoshop.**

Screwing into the front of your lens, it has the power to make contrast and colours in your landscape shots look more intense, to cut out unwanted reflections from glass and water, and even remove the sheen on shiny surfaces like cars. A polarizing filter is especially useful for landscape photography

when you're shooting scenes that include blue sky with fluffy white clouds, or big expanses of water.

The filter removes or reduces the amount of polarized light that's reflected from the sky, water or other surface. But as our eyes can't see the difference between normal light and polarized light, its effect can be rather hard to predict. You often simply have to try it to see whether it's going to help the scene you're shooting.

The filter is constructed with a rotating front element – the orientation of the glass needs to

be adjusted to match the direction of the polarized light. Generally, you turn the filter until you can see the maximum effect possible through the viewfinder. It's best to rotate the outer ring in an anti-clockwise direction when adjusting the polarizer to avoid unscrewing the filter from your lens by accident.

The effect is most pronounced when the sun is at 90 degrees to the scene, so it has little impact when shooting with the sun behind you. Similarly, it has little effect in overcast conditions.



## POLARIZING FILTERS

## STEP BY STEP USING A CIRCULAR POLARIZER

We show you how to transform your shots with this simple but effective lens accessory

**01 RIGHT SIZE FOR YOUR LENS**

A polarizing filter screws into the front of your lens and you'll need to buy one of the same diameter; our Canon EF 24-105mm f/4L IS USM lens requires a 77mm filter. The diameter is marked on the lens in millimetres and is usually prefixed with a Ø symbol.

**02 PREVIEW THE EFFECT**

A polarizing filter stops light from entering your camera from a specific direction. To see how it works, hold the filter up to your eye against the sky. To increase its effect, simply turn the outer ring on the filter to see how it changes the colours and contrast.

**QUICK TIP!**  
Don't use polarizers with ultra-wide lenses; the effect will be inconsistent across the expanse of sky and look unnatural

**03 SHOOT WITH THE SUN AT YOUR SIDE**

Polarizers are most effective in bright sunlight and blue skies, and the effect is strongest when the sun is to your side. As the polarizer blocks the light reaching your sensor by approx 1-2 stops, be prepared to bump up your ISO when shooting handheld; or use a tripod.

**04 FIND THE SWEET-SPOTS**

The filter's most pronounced effect is when the sun is at 90 degrees to the camera. A neat trick is to make a gun shape with your hand. Point the 'gun' barrel at the sun, rotate your wrist 90 degrees in either direction, and your thumb will point in the direction to shoot.

## TOP TIPS FIVE WAYS A POLARIZER CAN BOOST YOUR PICTURES

**01 CONTRAST IN CLOUDS**

As well as increasing the contrast and saturation to transform hazy blue skies into a beautiful deep blue on sunny days, a polarizer will increase the contrast of fluffy clouds, giving them added punch.

**02 SEE THROUGH WATER**

A polarizer can also remove reflections from water, cutting through the glare to the riverbed. The effect is most noticeable with smooth water and when the sun is 30 to 60 degrees above the horizon.

**03 REDUCE REFLECTIONS**

Polarizers can also remove distracting reflections from windows. If you're shooting at the correct angle to the building, you can cut out the reflections and see more clearly through the glass.

**04 SHINY SURFACES**

A polarizer can even kill reflections on shiny subjects, like cars. This effect works best when shooting at 90 degrees to the sun, therefore boosting the skies at the same time.

**05 BETTER B&W**

Polarizers are not just useful for boosting colour – a vibrant polarized landscape shot is perfect for a dramatic black-and-white conversion in Photoshop, turning blue skies black!

## PROJECT 3

## THE MISSION

Photograph a  
live music eventTime needed  
Two hoursSkill level  
Intermediate

## Kit needed

Midrange zoom  
• Telephoto lens  
• Wide-angle lens  
• Monopod  
• Flashgun • Spare  
batteries • Spare  
memory cards

# Music to your eyes

Get your camera and wellies – and learn how to shoot live music festivals

**L**ive music events are challenging to shoot. With difficult lighting conditions and fast-paced acts, the perfect shot doesn't happen by accident.

We headed up to the Bathfest music festival in Somerset. But whether you are shooting a large festival or an intimate gig in a bar, the fundamental skills are the same; you'll need fast shutter speed to freeze the performers and to expose for the lights to capture the ambience.

You also need the right kit for the job, and a midrange zoom, with a wide aperture, is the workhorse here – the faster the lens the better. Additional zoom lenses will add to the variety of your shots, such as telephoto for more intimate close-ups or wide-angle to show off the entire stage or massed crowd.

If you can wangle it, a press pass is worth its weight in gold; they allow access to the press pit, enabling you to shoot in relative comfort right at the front of the

stage or even behind the scenes. It's definitely worth contacting organizers of smaller events, who may be happy to provide a press pass in return for some images.

But festivals are about more than just the acts; shoot anything and everything for a more interesting documentary of the day. There is so much going on, from fairground rides to close-ups of festival-goers. With dance events, in particular, the crowds are usually far more interesting than the DJs on stage.

## STEP BY STEP GETTING THE GIG

How to shoot live music indoors, with limited space and lighting



### 01 ALL-ROUND ZOOM LENS

You will often find that you cannot move much, in which case pick a versatile midrange zoom lens with a wide aperture that is good for everything. Our EF 24-105mm f/4L IS USM worked excellently.



### 02 HIGH ISO

To capture the lights in the background, set your ISO as high as you can before the images feature too much grain (which depends on your camera), allowing faster shutter speeds.



### 03 LIGHT UP THE STAGE

Try using a flashgun to add a blip of light to lift the performers. Don't use full power as it'll be too bright, overpowering the stage lighting, and will take longer to recharge between shots.



### 04 PICKING A POSITION

When there is no press pit to shoot from safely at small venues, try the sides of the stage; be wary of rowdy crowds that could knock your camera or spill drinks over your precious kit!



SHOOTING **FESTIVALS****EXTRAS** ESSENTIAL KIT TO SHOOT LIVE MUSIC**01 TELEPHOTO LENS**

Telephoto zooms enable you to get closer to both the acts and crowds, especially on larger stages. We used Canon's EF 70-200mm f/2.8L IS USM and EF 100-400mm f/4.5-5.6L IS II USM.

**02 WIDE ANGLE LENS**

A wide-angle lens, such as our Canon EF 17-40mm f/4L USM, can be just as important when you are trying to squeeze in the whole stage to capture a full band, and are ideal for shooting the audience.

**03 EAR PLUGS**

Standing in front of a large bank of speaker towers is incredibly loud and can damage your ears – and give you a terrible headache! A pair of ear plugs will make things much more comfortable.

**04 SPARE BATTERIES**

Always take spare batteries, particularly if you're in a tent for the weekend with nowhere to recharge them. As a guide, manufacturers claim a battery life of around 800-850 shots.

**05 MEMORY CARDS**

You don't want to be held up by running out of space and spending time erasing photos – or sacrificing quality by switching to JPEG. We filled up a 16GB card shooting Raw files in under three hours.



### STEP BY STEP CAUGHT IN THE ACT

Everything you need to know about shooting a festival



#### 01 ADJUSTABLE LIGHTING

To combat the changes in light when moving around, set your camera to Tv shooting mode so that you can pick a shutter speed and not worry about the rest. If you're a Manual fan, set your ISO to Auto.



#### 02 KEEPING UP

Set a fast shutter speed. As a rule, it should be at least equal to your focal length (so 1/400 sec for a 400mm lens). But don't go unnecessarily high as you'll have to increase ISO sensitivity, sacrificing image quality.

### FILL-IN FLASH

When shooting from up close and in darker areas, use a flashgun. Set your camera to expose for the background, with a wide aperture and high ISO, and use the flash to complement these settings, with a low power that just lifts the performer from the background. This will cause the background to be evenly exposed, retaining the atmosphere of the stage lights, as well as the foreground being well lit. The flash will also freeze movement, allowing for slightly longer shutter speeds than you can use without flash.



#### 03 KEEP 'EM COMING

Continuous drive mode will ensure you capture the best shot; with so much going on at a fast pace it can be easy to miss the perfect pose. Hold down the shutter release to keep firing in bursts of shots.



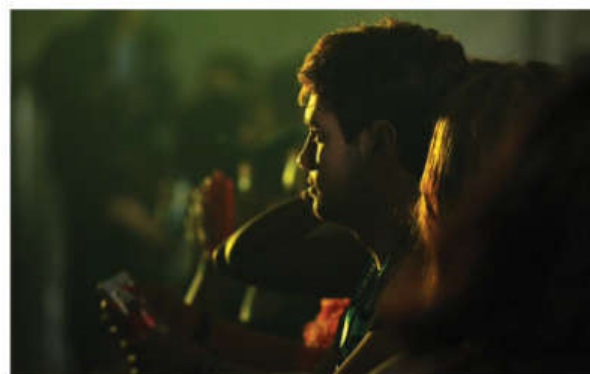
#### 04 EXPOSE FOR THE LIGHTS

Keep your aperture wide and ISO high enough to capture the background as well as the bands. It's important that your exposure captures the stage lighting, which adds hugely to the atmosphere.



#### 05 A STEADY GRIP

When using longer lenses, a monopod will help not only keep your shots steadier, but prevent your arms from tiring too quickly. Bigger telephoto lenses have a mounting bracket to support the front-heavy weight.



#### 06 SHOOT THE LIGHTS

Stage lighting constantly changes. Watch for when the lights hit the audience and shoot candid crowd shots; this moody interplay of light and dark looks great, as the bright light picks out your subject.



## WHAT TO SHOOT? CROWDED HOUSE

Capture the atmosphere of a festival by shooting the crowds



### 01 ABOVE & BEYOND

When stuck in a large crowd, switch your camera to Live View and hold it up, above the crowd, to look across the top. In some cameras, autofocus does not work too well during Live View, so manually set the focus beforehand as it can be difficult to see the screen clearly enough when lifted high.



### 02 ACCESS ALL AREAS

Getting a press pass will not only give you permission to photograph but allow you access to more areas, such as the press pit in front of the stage, and sometimes even on the stage behind the acts. This is a great opportunity to shoot the crowds from the stage while including the acts.



### 03 SHOOT THE MASSES

Get a good vantage point, either above the crowds or in the press pit in front of the audience. At lively events the crowds will often be jumping around with their hands in the air, really portraying the mood. In this image we've shot from the press pit, looking along the front of the crowd.

## WHAT TO SHOOT? FESTIVAL FESTIVITIES

It's not all about the acts, the essence of the festival can be captured in the people



### PASS ON BY

With festivals there is an awful lot going on. Try shooting the less-obvious, rather than focusing only on the performers. Here, a group walk straight past the stage, seemingly uninterested in the band.



### THE LIFESTYLE

For many, festivals aren't just an afternoon out, they're a way of life. Shooting events can be about capturing this lifestyle, and festival-goers casually relaxing in the sun can provide excellent portrait opportunities.



### THE LITTLE DETAILS

Look for little things going on around the event. Festivals are full of colour and interesting sights, such as this rainbow-coloured umbrella with a stream of smoke floating out in front of it.



### RIDE THE FESTIVAL

To capture the essence of festivals, try shooting people enjoying the rest of the event. To shoot fairground rides, increase your shutter speed to 1/1000 sec and keeping your back to the sun, follow the ride around.



### THE WHOLE SHOW

With a wide-angle lens we can fit the entire stage in. This technique is well suited for creating a grand spectacle of the set, though it may take a few attempts to get all of the band in a good position at once.



### DANCE DANCE

There are always a bunch of 'interesting' individuals to be found at these events, creating some bizarre sights to photograph. These banana-costumed funsters made for some excellent photo opportunities.



## THE MISSION

Use different lights to shoot still-life setups at home

**Time needed**  
Half a day

**Skill level**  
Intermediate

**Kit needed**  
Kit or macro lens, a pair of desk lamps, an assortment of coloured and white paper, black material, torch, light tent, tripod, remote shutter release

# Let there be light!

Master a selection of different lighting techniques to shoot four still-life photography projects in the comfort of your own home

**T**he key to successful tabletop home studio photography is the lighting, and how to use it to create a variety of effects without spending a fortune on professional equipment. So in this project we're going to look at four simple setups that anyone can shoot,

covering everything from making your eBay listings look more attractive to arty shots of fruit and flowers. We'll use a variety of light sources – window light, a pocket torch and couple of lamps (we used LED lights, but anglepoise desk lamps will do). A macro lens is great for getting close to still-life subjects, but you

can use your kit lens to shoot all four setups. You'll also benefit from a few inexpensive extras – such as some fabric and paper for the backdrops, a reflector and a light tent for creating a more even lighting for some of our close-up setups. So, clear some space on the kitchen table and rig up your own still-life studio.



# TABLETOP STUDIO STILL-LIFE PHOTO ESSENTIALS

All these items will come in handy when you're shooting objects in your home studio

## 01 CONSTANT LIGHT SOURCES

We used a couple of Manfrotto LED lights, but anglepoise lamps with flexible heads that let you direct the light are ideal for small home studio projects. Using two gives foreground and background lighting, and boosts ambient lighting on dull days.

## 02 DARK MATERIAL

A piece of black material absorbs light, so when lit correctly it looks as though a subject is literally floating in black. Black velvet is the best fabric to use – buy a couple of metres at a material shop, but make sure you don't buy the crushed sort!

## 03 TORCH

Light painting is a quick, easy way to manipulate the light in exactly the way you want. A small but powerful pocket torch, such as a Maglite, can be directed as needed, and a focusable beam gives you complete creative control.



## 04 A2 SHEET OF PAPER

An inexpensive and easy solution for creating backdrops, as well as being cheap and readily available from art stores, a large, heavyweight sheet of paper with a matte and subtly textured finish will help to avoid reflections.

## 05 LIGHT TENT

These simple translucent structures are great for cutting out reflections and creating even lighting for product photography – using nothing but natural light from a window. You can pick up a small light tent for as little as £30/\$45.

## 06 REFLECTOR

Even with diffused light, shadows can be a real issue, but this can easily be resolved with a small reflector. For still-life projects, look for one with silver and white surfaces. You can pick up a Westcott 20-inch 2-in-1 Silver/White Reflector for £15/\$15.

# PROJECTS

## PROJECT 4



### SETUP 1 STOCK SHOTS

#### Shoot web-ready images

Get set up close to a window; position a piece of white paper up and over a cereal box to create an 'infinity curve', which gives a seamless backdrop. Arrange your background and subject so that, once framed, it will be surrounded by white. Check how the lighting falls; you want it to be as even as possible – if your subject is casting shadows, a reflector can be used to fill them in. If you don't have a reflector, a simple sheet of white paper will do.

**Kit needed:** Sheet of white paper, reflector, tripod, remote release

**Exposure:** 1/13 sec, f/7.1, ISO100



### SETUP 2 EBAY IMAGES

#### Show items in their best light

Set up a light tent on a table so that the open side is at a right angle to the window. The ambient light will be just enough to create a good softened light; you won't need any torches or lamps. The light tent not only diffuses the daylight but also helps to reflect some light back at the subject. Now arrange a small item inside the tent. If there is a lot of glare on the surface, rotate the tent slightly away from the window to soften the light further.

**Kit needed:** Light tent, tripod, remote release

**Exposure:** 1/2 sec, f/11, ISO100







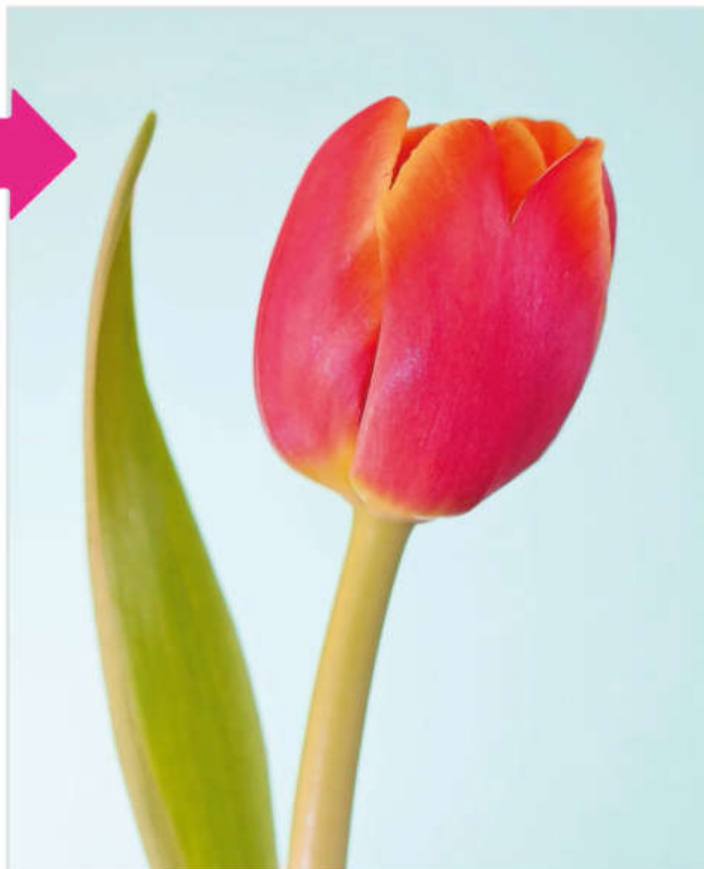
## SETUP 3 STILL-LIFE FLOWER

### Simple lighting for flowers

Prop up some coloured card (pick a complementary colour to your flower) to create the backdrop, ensuring it fills the frame when looking through the viewfinder. Place your flower in front of the card, with enough space to position one of the lamps behind it, pointing upwards and towards the card for your backlight. Place the second lamp in front of the flower, just off to one side. Close the curtains to reduce the ambient light.

**Kit needed:** Sheet of coloured paper, two lamps, tripod, remote release

**Exposure:** 1 sec, f/8, ISO100



## BEAT THE SHAKES

Still-life close ups require narrow apertures for a reasonable depth of field, so your exposure times will be longer. There are two essential pieces of equipment that will enable you to capture pin-sharp shots: a tripod and a remote shutter release, which will enable you to fire the shutter without directly touching the camera and inadvertently jogging it. If you don't have one, use the 2-sec Self-timer drive mode instead.



## SETUP 4 FLOATING FRUIT

### Create shadows and highlights

Drape a piece of black material over a box, ensuring that you have a good length in the foreground to place the fruit on, so that once composed the subject will be surrounded by black. Position the fruit in the middle of the cloth. Make the room as dark as possible, so that the only light shining on the fruit is that produced by the torch. Hold thin paper (a cupcake case is ideal) in front of the torch to diffuse the light; this will reduce reflection on the skin of the fruit.

**Kit needed:** Black material, torch, cupcake case, tripod, remote release

**Exposure:** 1 sec, f/9, ISO100







### THE MISSION

Shoot a perfectly sharp landscape with the hyperfocal distance technique

**Time needed**  
One hour

**Skill level**  
Advanced

**Kit needed**  
Tripod • Hyperfocal distance chart or smartphone app

# Hyperfocally speaking

Take depth of field a step further, we explain how to shoot a pin-sharp landscape, from the nearest rock pool to the distant castle

**G**etting your landscapes completely sharp is tricky, but exploiting a phenomenon of depth of field can help you get a tack-sharp scene every time.

Depth of field is the distance either side of the focal point that is 'acceptably sharp'; it's determined by aperture, focus distance and focal length, and extends twice as far behind the focus point as it does in front. The point of using

hyperfocal distance focusing is to focus at the point at which the depth of field stretches to 'infinity' – but not beyond – so that the maximum possible amount of the scene appears sharp.

You get a greater depth of field at shorter focal lengths and narrower apertures – so, if you shoot at an aperture of  $f/16$  with a 16mm wide-angle lens on a full-frame camera, the hyperfocal distance is 50cm. Focusing at this

point will make everything from roughly half this distance (25cm) to infinity appear sharp.

Before dialing in your lens's narrowest available aperture, you need to take 'diffraction' into account, as images become progressively softer at narrow apertures, due to light being diffracted by the aperture blades. This becomes noticeable beyond around  $f/16$  on an APS-C sensor, or  $f/22$  on a full-frame sensor.



# STEP BY STEP HYPER-SHARP SCENIC SHOTS

Learn landscape shooting skills to capture the maximum possible depth of field



## 01 A STEADY HAND

Shooting with a tripod not only keeps the camera rock-steady for long exposures, it also grants more time to perfect composition and enable precise focusing, so we can set hyperfocal distance with care.



## 03 WORK OUT THE HYPERFOCAL DISTANCE

Use your hyperfocal distance app (or our tables) to cross-reference your focal length (24mm in our case) and desired aperture. Shooting at f/16 on our full-frame Canon, gives us a hyperfocal distance of 1.1m.



## 05 ACCURATE FOCUS

Use autofocus on a point at the hyperfocal distance, then switch to manual focus to lock it in (try focusing on yourself with a remote release). For our shot of the castle (left) we focused on the first rock pool.



## 02 KEEP IN CONTROL

Swapping to Manual mode gives you complete control over your exposure. Set the focal length to fit your scene – we shot at 24mm – but bear in mind that the wider the angle, the greater your depth of field will be.



## 04 MEASURE IT OUT

Everything from around half the hyperfocal distance (in our case 55cm) to the horizon will be sharp. Unless you're carrying measuring tape, you'll need to judge the hyperfocal distance by eye, or roughly pace it out.



## 06 BEAT THE SHAKES

You'll need to avoid touching the camera to prevent camera shake, so use a remote release (or the 2-sec Self-timer Drive mode). Disable image stabilization – this can cause shake when not shooting handheld.

## BUT IS IT ACCEPTABLE?

A lens can only focus at one point at a time, and only objects at this distance will be precisely in focus. However, some of the area in front of and behind this will be of acceptable sharpness – where the degree that the image is defocused is negligible at a normal viewing distance. When shooting with a wide-angle lens and at a narrow aperture, the area of acceptable sharpness can stretch from just a few centimetres in front of the camera all the way to infinity.

## TO INFINITY AND BEYOND

Infinity is the point beyond which everything appears at equal sharpness – it varies according to focal length, but can be as little as a few centimetres away on a wide-angle lens. When you focus at the hyperfocal distance, everything from half this distance up to the infinity mark – and beyond – will be acceptably sharp.



# PROJECTS

## PROJECT 5



### SETUP 1 UP CLOSE

#### Hyperfocal landscape close-ups

**IN THIS** image our foreground subject was just half-a-metre away. We have achieved an acceptable level of sharpness across the far distance by using a narrow  $f/16$  aperture along with a wide (19mm) focal length. As shown in the chart (right), wider focal lengths provide a closer hyperfocal distance, and thus a greater depth of field. For this image we focused on the edge of the foreground bail; the resultant depth of field stretches along the entire 'face' of the bail, ensuring both it, and everything beyond it as far as the eye can see, appears nice and sharp.

**EXPOSURE** 1/160 sec,  $f/16$ , ISO50



### SETUP 2 FURTHER AFIELD

#### Larger-scale hyperfocal distance

**OUR SECOND** example is of a slightly wider landscape. This time around, we're not shooting quite so close to our foreground interest. We have still used a wide (22mm) focal length to fit in the whole scene, but can get away with a wider  $f/8$  aperture and still provide acceptably sharp detail throughout the frame, from the tree and wall in the foreground to the distant mountains. As the effects of diffraction are less apparent at wider apertures, and lenses generally sharper at around  $f/8$ - $f/11$ , you'll get a sharper image if you shoot at mid-range apertures.

**EXPOSURE:** 1/400 sec,  $f/8$ , ISO50





## GO THE FULL DISTANCE

**USING OUR** hyperfocal charts – or a smartphone app – gives the distance to focus at from the focal plane of the camera, so that everything between it and ‘infinity’ will appear sharp. However, because depth of field stretches in front of the hyperfocal distance point, as well as beyond it, objects up to around half this distance will appear acceptably sharp, too. So if you were to use a 50mm focal length focused at 14 metres away at f/5.6 on a full-frame camera, a subject between roughly seven and 14 metres would also appear acceptably sharp – enabling you to get more benefit from the depth of field.

## SOFTWARE HYPERFOCAL DISTANCE CALCULATORS

You don't have to carry around charts and tables – your smartphone can be your constant hyperfocal calculator companion

**THERE ARE** plenty of smartphone apps that will calculate the hyperfocal distance for you on both iOS and Android – we used free app HyperFocalPro on Android, downloaded from Google Play, which we found simple and straightforward to use. You can input your camera model, focal length, aperture and the subject distance. With all of this information, the app generates a 2D diagram, showing the depth of field and the hyperfocal distance, for you to better understand the information. There is also a table view for the selected camera, and this can be simpler to use if you do not know the exact subject distance but want to guesstimate. The best thing about this app is that, once installed, it does not need an internet connection when out and about, making it useful for use in the field without racking up excessive data charges.



## READING HYPERFOCAL CHARTS

It's complex, but we've done the maths so you don't have to...

**WE'VE PROVIDED** tables for full-frame and APS-C sensors. Select your focal length on the horizontal axis and aperture on the vertical axis to see how far from the camera you should focus, in metres, for maximum sharpness all the way up to the horizon. For an interactive chart, where you can input your own focal lengths, see <http://bit.ly/hypercalc>

### FULL-FRAME SENSOR TABLE

	16mm	24mm	35mm	50mm	85mm	135mm	200mm
<b>f/2.8</b>	2.9	6.4	13.7	27.9	80.6	203.4	446.4
<b>f/4</b>	2	4.5	9.6	19.5	56.4	142.4	312.5
<b>f/5.6</b>	1.4	3.2	6.8	14	40.3	101.7	223.2
<b>f/8</b>	1	2.3	4.8	9.8	28.3	71.2	156.3
<b>f/11</b>	0.7	1.6	3.5	7.1	20.5	51.8	113.6
<b>f/16</b>	0.5	1.1	2.4	4.9	14.1	35.6	78.1
<b>f/22</b>	0.4	0.8	1.7	3.6	10.3	25.9	56.8
<b>f/32</b>	0.3	0.6	1.2	2.4	7.1	17.8	39.1

### APS-C SENSOR TABLE

	16mm	24mm	35mm	50mm	85mm	135mm	200mm
<b>f/2.8</b>	4.6	10.3	21.9	44.6	129	325.4	714.3
<b>f/4</b>	3.2	7.2	15.3	31.3	90.3	227.8	500
<b>f/5.6</b>	2.3	5.1	10.9	22.3	64.5	162.7	357.1
<b>f/8</b>	1.6	3.6	7.7	15.6	45.2	113.9	250
<b>f/11</b>	1.2	2.6	5.6	11.4	32.8	82.8	181.8
<b>f/16</b>	0.8	1.8	3.8	7.8	22.6	57	125
<b>f/22</b>	0.6	1.3	2.8	5.7	16.4	41.4	90.9
<b>f/32</b>	0.4	0.9	1.9	3.9	11.3	28.5	62.5



## THE MISSION

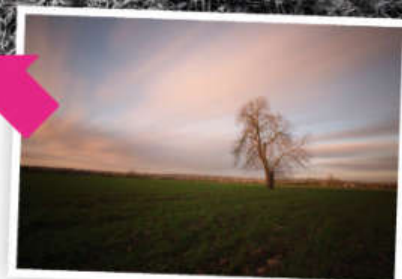
Discover the joys of black-and-white photography, from shooting different subjects to killer mono conversions

**Time needed**  
1-2 hours

**Skill level**  
Intermediate

**Kit needed**  
Photoshop CS/CC

# Create brilliant black & white images



You can't beat black and white for adding real impact to your images. We reveal the best ways to convert your colour shots to monochrome

**S**eeing the world devoid of colour could be construed as rather depressing, however, as we're setting out to prove, black and white is actually a way to enhance the world around you – and a brilliant way to improve your photos.

By nature and design, colourful objects stand out in your shots – and sometimes they stand out in a *bad* way. By converting your colour shots to black and white, you remove colour as a distraction, and the eye then homes in what's the most dominant part of your shot

– be it a tall building, a person's face, or tree in a landscape.

A monochrome image also only deals in tones; a mixture of various degrees of highlights, midtones and shadows. So you need to be creative and use light effectively in your shots so the main subject or focal points are most prominent.

Although your Canon DSLR has a Monochrome preset picture style, it only offers a fairly functional in-camera black-and-white conversion. It is useful, however, to act as a preview on the LCD to show how a shot will roughly look in mono. Also remember that,

when you shoot in Raw, your picture style will be previewed on your camera's LCD, and recognized if you open your Raw images in Canon's Digital Photo Professional on your PC – but won't be recognized when you open the image in Photoshop.

So we often shoot in Raw+JPEG, that way, we have the in-camera black-and-white converted JPEG for reference, but also a full-colour Raw file with which to carry out a more-careful conversion on my computer, using software such as Photoshop (see over the page). This gives greater control over monochrome conversions.



# HOW TO UTILIZE BLACK & WHITE CONVERSIONS

Make the most of your photos by releasing their full potential with a mono conversion

Don't get the wrong idea: we're not saying that black-and-white conversions are a way to rescue rubbish colour photos. Far from it. What we are saying is that black and white can sometimes be the best way to turn a *good* shot into

a *great* one. An example is dull, overcast weather: under this flat lighting, scenes tend to look boring, plus there isn't actually that much colour to enhance, so why not simply remove it? By making a virtue of the lack of colour, you can

concentrate on working on the tones, by brightening highlights and midtones, and darkening shadows. Sharpening black-and-white images can really bring out detail and boost contrast more effectively than in a colour shot.

## QUICK TIP!

A black-and-white conversion can work well when you're taking photos in high-contrast mixed lighting



### 01 BUILDINGS ARE BETTER IN B&W

A near-white sky is improved with a mono conversion, while you can boost shadows and sharpen to enhance structural detail.



### 02 BLACK & WHITE BOUDOIR

A subject in front of a bright window often means disaster – but a monochrome makeover accentuates the model's shape.



### 03 ACTION-PACKED MONOCHROME

Sporty shots don't have to be full of colour – with it removed and the shot sharpened, this rider, bike and dirt jump out at you.

## 55 PICTURE STYLE CAMERA SKILLS NO-HOSE MONOCHROME STYLE



### 01 RAW+JPEG

Select RAW+JPEG image quality, so in conjunction with the Monochrome picture style, you'll get a converted black-and-white JPEG, but still have a full-colour Raw file, should you need it.



### 02 MONOCHROME STYLE

Press the Picture Style button (or find the option through the Quick Control Screen or menu system), then scroll through to highlight M for Monochrome, and press the Set button to select it.



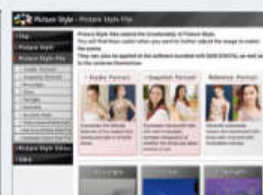
### 03 CUSTOMIZE STYLE

You can also customize the Monochrome picture style. With M highlighted, press Info to change the settings. For monochrome, boost Sharpness up a click, and put Contrast up to near maximum.



### 04 FILTERS & TONING

In the Monochrome picture style, you also have Filter Effects (Yellow, Orange, Red, Green) and Toning Effects (Sepia, Blue, Purple, Green). The Blue effect works well for a cool B&W look.



### 05 PICTURE STYLE FILES

You can also download more picture styles for further options. These can be applied via the free Canon Picture Style Editor software, as well as to your DSLR itself. See [http://bit.ly/pic\\_styles](http://bit.ly/pic_styles)

# BLACK & WHITE IS BEST FOR PORTRAITS

Learn four different approaches to transforming your colour portraits



## FLOWERS IN MONOCHROME

Although it might seem somewhat radical to convert a vibrant, colourful shot of a flower to black and white – by going against the norm, you can create strong, visually arresting images. Without colour distracting your eye, the tones and stripes on the flower's petals stand out, and the background instantly becomes second-best in the mono conversion, compared to the green backdrop of the colour shot.



## 01 FAB FAMILY PORTRAITS

Try converting family portraits to black and white. Stripping out distracting colour in backgrounds behind people is also a great solution for ensuring the eye remains on your subjects. This mono conversion also removes the colour from the little girl's clothes.



## 02 DRAMATIC BLACK & WHITE

You can make portraits look more dramatic when converted to black and white, with more control over creating flattering skin tones when processing shots, as well as lightening them in a high-contrast finish. All this combined creates a great, timeless portrait.



## 03 GET THE DESATURATED LOOK

In Photoshop it's simple to control the amount of colour in your shots, and instead of a 100% black-and-white conversion, try desaturating portraits for a more artistic feel. Do this in Adobe Camera Raw, or with a Hue/Saturation adjustment layer in Photoshop.



## 04 TREAT YOURSELF TO A TINT

Add a tint to black-and-white portraits to give them an edge when creating monochrome conversions in Photoshop. Sepia and yellowy/orangey tints create a retro look, whereas the cooler blue tint we've used here gives the portrait a more modern, futuristic feel.

DOWNLOAD PROJECT FILES TO YOUR COMPUTER FROM: <http://downloads.photoplusmag.com/PM253.bw.zip>

## STEP-BY-STEP CAMERA RAW CONVERSIONS FOR HDR



## 01 RAW IMAGE B&W CONVERSION

In Adobe Camera Raw, we set Saturation to -100. We also boosted Exposure, Contrast, Shadows and Whites, and dropped Highlights and Blacks. Clarity was also increased.



## 02 GRADUATED FILTER

Apply two Graduated Filters: Exposure -1.35, Contrast +18 to darken the sky; and a 'thin' one at the horizon, Exposure +90, Contrast +47, Shadows +22 to lighten the land.



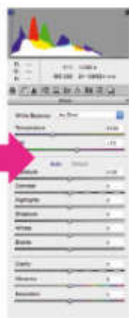
## 03 ADJUSTMENT BRUSH

Next, we used the Adjustment Brush and painted over the land beneath the tree and the tree itself, with Exposure +90, Contrast +47, to highlight these areas in the scene.



# STEP BY STEP CONVERT RAWs FOR GREAT BLACK & WHITE

Take control of black-and-white conversions by using colour channels in Adobe Camera Raw



## 01 START WITH RAW

Open your colour Raw image in Adobe Camera Raw (in Photoshop CS/CC, not Elements). Scenic shots shot on sunny days with lots of contrast and bright blue skies are made for great black-and-white conversions. But this shot could do a good polish to realize its potential.

## 02 CONVERT TO GRAYSCALE

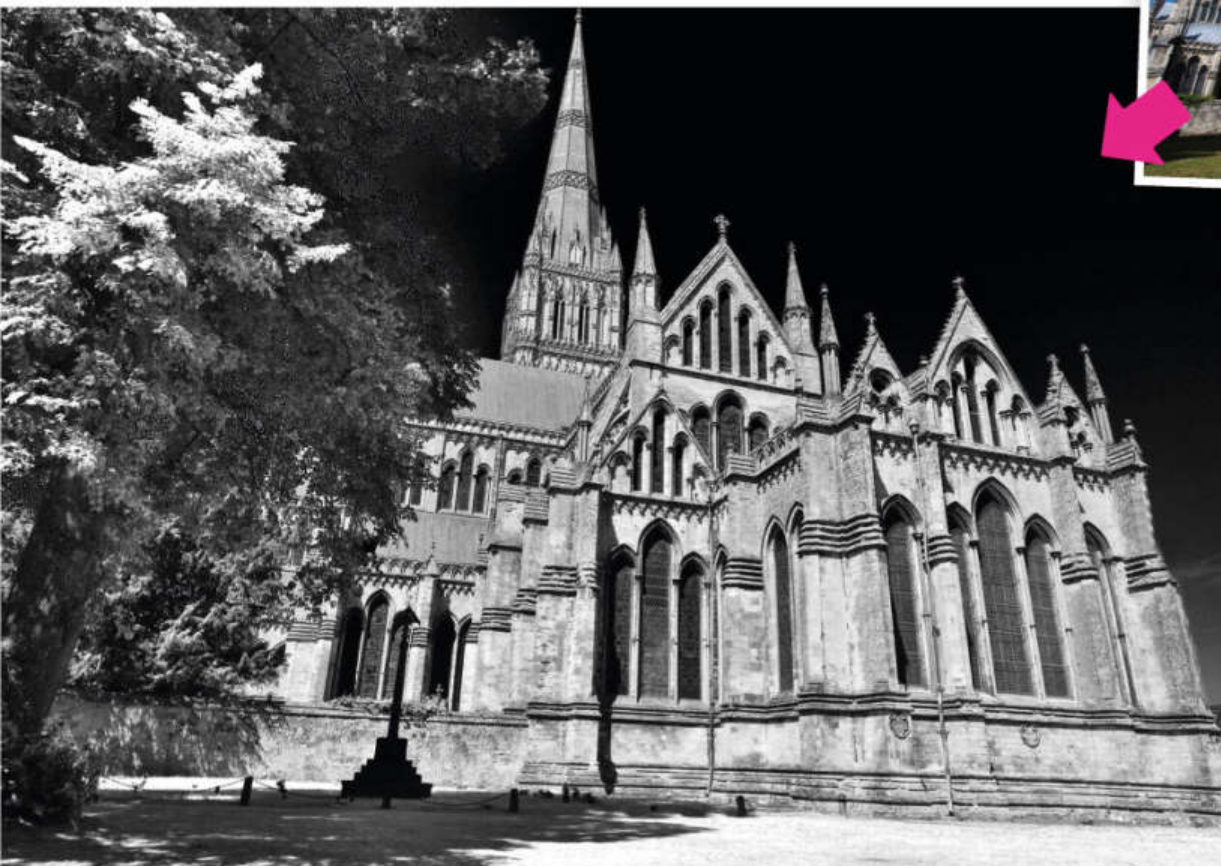
Click on the Grayscale/HSL tab, and click Convert to Grayscale. From here you can simply use the eight colour channel sliders to brighten and darken selected areas of your image. For example, we set Yellows to +30 and Greens to +50 to lighten the church and foliage.

## 03 BOOST CONTRAST AND DETAIL

Back under the Basic tab, we've boosted Exposure and Shadows to lighten the image. We also increased Contrast and Whites, and decreased Blacks – all working to boost the contrast of different tones within the scene. Finally, Clarity is set to +10 to boost edge detail.

# HOW TO CREATE THE B&W INFRARED LOOK

Take your black and whites to another level with an infrared-type effect



**THE BEST** black-and-white infrared shots are those with plenty of light and contrast, and a mix of vivid blue skies, buildings, foliage and grass, as all these elements can be enhanced separately for an out-of-this-world finish. Use Photoshop's Infrared preset when making a black-and-white conversion, then fine-tune the colour channel sliders to pinpoint areas you want to be lighter or darker, to help the focal points or subjects stand out in shot. It's a great excuse to push the boundaries, when processing images, as you can get away with much higher-contrast images, with bright white highlights and jet black shadows.





## THE MISSION

Photograph birds of prey in flight at a bird sanctuary

**Time needed**  
Two hours

**Skill level**  
Intermediate

**Kit needed**  
• Telephoto lens  
• Tripod

# In-flight entertainment

Take your bird-of-prey photography to soaring new heights

**A sharp photo of a swooping bird of prey is a real feather in the cap for any aspiring wildlife photographer.** But birds in flight are among the most challenging animals to capture with your camera, and such is the reverence for the subject that the term even has its own acronym in wildlife circles – BIF.

As well as a stiff test of your camera gear and technique, the perfect shot relies on a fair degree of luck. But this is all part of the allure of bird photography, and

there are a few ways in which you can stack the odds in your favour.

The easiest way to get up close to birds of prey is at a sanctuary or zoo. We went to the wonderful Hawk Conservancy Trust in Hampshire for our avian shoot ([www.hawk-conservancy.org](http://www.hawk-conservancy.org)). Places like this not only put on aerial displays to which photographers are more than welcome (there were lots of long, grey lenses on show during our visit) but many host specialist photography days and private sessions where you can work with

the falconers to get top shots of our feathered friends in flight.

When it comes to setting up your camera and choosing the right gear, there are plenty of techniques you can use, which we'll look at here. But success doesn't just rely on the best kit or a prime location; a knowledge of the subject is equally important. If you know where and when they are likely to appear, you can get into position for the perfect shot. We'll show you how to anticipate the action and capture bird behaviour at its best.



VIDEO ALSO ONLINE  
[http://bit.ly/pp\\_104\\_5](http://bit.ly/pp_104_5)

The Ultimate  
**Canon SLR**  
 Handbook Volume 4  
 VIEW THE VIDEO

## PROJECT 7

# WINGING IT BIRD PHOTOGRAPHY BASICS

Improve your chances of capturing the perfect flight shot



### 01 EXPOSE CORRECTLY

Birds moving from bright sky to dark trees can play havoc with your metering. Use Manual mode so the exposure stays the same, even if the background changes.



### 02 TRACK THE SUBJECT

For solid panning, rather than twisting the shoulders, lock your elbows down then turn at the waist so your torso pivots as one. Or use a tripod and gimbal head.



### 03 FILL THE FRAME

Use a telephoto lens to fill the frame from a distance. A Canon EF 100-400mm f/4.5-5.6L IS II USM on a crop-sensor 60D gave us a focal length of 640mm.



### 04 SHARP SHOOTER

Fast-moving birds require responsive AF. The quicker the lens is at focusing and the more focus points your camera has, the greater your chances of sharp bird photos.

## ESSENTIAL CAMERA SKILLS SET UP YOUR DSLR TO CAPTURE MOVING SUBJECTS



### 01 FAST SHUTTER

Moving subjects, long focal lengths and panning cameras mean that anything slower than 1/1000 sec is likely to result in motion blur, so set a fast shutter speed and increase ISO to compensate, if necessary.



### 02 BACK BUTTON FOCUS

Set back button focusing; keeping focusing and shutter separate means you can trigger autofocus with your thumb as you track your moving subject, then use your forefinger to press the shutter at the perfect moment.



### 03 AI SERVO MODE

AI Servo is Canon's predictive focusing mode. Not only will the camera's autofocus continually engage as long as the AF button is pressed, the subject movement will also be tracked and its next move anticipated.



### 04 HIGH DRIVE

A high-speed drive rate helps improve your chances of getting the perfect shot. The camera will fire continuously while the shutter button is held down, giving you a sequence of frames to choose from.



### 05 TRIPOD

Telephoto lenses can be difficult to handhold, and longer focal lengths increase chances of shake. A tripod will help. A gimbal head is ideal for following movement fluidly, but a video or pan/tilt head can be a good substitute.



# TOP TIPS SIX WAYS TO CAPTURE BIRD BEHAVIOUR

Learn how to anticipate the action and find the best angle



## PANNING FOR MOTION BLUR

If you're shooting the flight path side on, then you could try lowering the shutter speed and panning with the subject to blur the background. As a starting point, set a shutter speed of around 1/100 sec then try to keep the bird perfectly central in the frame as you shoot. It can be tricky, but get it right and the subject will be sharp while the background is blurred by the motion. It's also worth trying a slower shutter speed when straight on to blur the movement of wings, which adds a nice sense of motion to the shot.



## 01 WHERE'S THE WIND?

Birds of prey rely heavily on the direction of the wind for flight. They're happier flying into the wind as this gives them the uplift they need to keep steady. Position yourself upwind to capture them head-on.



## 03 BIRD PORTRAITURE

At sanctuaries and zoos birds can be photographed when perched. Approach this as you would a typical portrait. Focus on the eyes and shoot wide open, and the background will slip into beautiful blur.



## 05 INCLUDE THE SURROUNDINGS

When composing a shot, think about the background. A plain sky can look bland, so try to shift your angle to include land or trees; a hint of the surroundings adds context to the shot and helps to ground the subject.



## 02 TAKE-OFF AND LANDING

A moment before bigger birds land they spread their wings and softly swoop to the ground, which is a good time to try and capture them. Again, the wind plays a part as they prefer to take off and land into the breeze.



## 04 PRE-FOCUS ON A SPOT

If you can anticipate where the bird is likely to swoop (such as for food in the falconer's hand or a fish in a pond) try composing and pre-focusing on that spot, then shoot continuously as they enter the frame.



## 06 LIGHTING

Sunlight from behind works particularly well during take-off, as it filters through the bird's wings for a beautiful backlit effect. And a low sun can add warmth to the scene for a more atmospheric shot.



## ESSENTIAL LENS SKILLS SET UP YOUR TELEPHOTO

There's more to telephoto zooms and primes than just a long reach...



### 01 ENGAGE THE FOCUS LIMITER

Most super-telephoto zoom lenses have a focus limiter switch, like this, on the barrel that will lock off the closest part of the range. This helps to prevent 'hunting' while focusing on a distant subject. So if you know your subject isn't going to get close, limit the focus range.



### 02 SET UP STABILIZATION

Some lenses have two or three IS modes. Mode 1 is for standard stabilization in all axis, while Mode 2 detects the panning motion of the camera and doesn't correct stabilization in the direction of movement, so is better for birds in flight. Mode 3 only engages stabilization during exposure.



### 03 USE THE HOOD

A lens hood is a must when you're pointing your camera skyward, as it keeps the front element shaded to prevent flare fogging your shot. Some newer hoods, like the one on our Canon 100-400mm lens, have a handy side window through which you can adjust filters without removing the hood.

## COMMON MISTAKES DON'T BE A BIRD-BRAIN

Some of the biggest pitfalls of bird photography – and how to avoid them



### CROPPED FEATHERS

When framing your shot, it can be tricky to judge the wingspan of the bird in flight, so take extra care not to crop off any outstretched feathers.



### FOCUS JUMPING

Watch that your focus doesn't accidentally jump onto the background, rather than the subject. Setting your camera to AF Point Expansion can help prevent this.



### UNDEREXPOSURE

A small subject on a bright background will fool your camera into underexposing. To expose for the bird, dial in exposure compensation or use Manual mode.



### BACKGROUND CAGES

Watch out for cages, sheds and signs of enclosure while tracking birds in flight – your composition will usually be better off without them.



### DOF TOO SHALLOW

A shallow depth of field might result in a sharp tail but soft eyes, so consider sacrificing a stop of ISO for a higher f-number to increase depth of field.



### OUT-OF-FOCUS

A few soft shots are inevitable, but you can increase your chances with the right autofocus settings, a high drive rate and plenty of perseverance.

## PROJECT 8



## THE MISSION

Take your DSLR into the sea and keep it safe and dry with an underwater housing

## Time needed

One hour

## Skill level

Intermediate

## Kit needed

- Underwater bag
- Tissue paper
- Silica gel

# Shoot in the sea

Keep your DSLR safe from harm on a swimwear shoot by the sea with a simple, inexpensive underwater housing

**U**nderwater housings offer the opportunity to shoot from a new perspective, safe in the knowledge that your camera is protected. Hard underwater cases, that are made to measure for specific camera bodies, can cost upwards of a thousand pounds. So for most of us, a more realistic option is a soft, watertight bag like the Aquapac DSLR Camera Case (£80/\$105) or DiCAPac WP-S10 (£55/\$60) we used on our shoot. These housings have a cylindrical space for your

lens, fronted by clear, hard plastic. The idea is you press the buttons through the soft material of the bag. Although they look quite cumbersome, it's surprising how easily you can control the camera.

These bags are made to be tough, and you needn't worry about your camera sinking, either, as there's enough air in the bag to ensure it stays afloat (in fact, Aquapac claims that a camera lost at sea was found a week later, in perfect working order). Of course, it's not just water that can kill your camera; sand is notoriously

dangerous. So even if you're not planning on taking a dip, the bag is useful protection at the beach.

The great thing about these bags is that you can get really close to the action and not worry at all about your camera. There's something quite thrilling about being able to dive into the surf with your DSLR, or drop it down in the waves. We left the beach with a memory card full of fun, watery photos, and a completely dry camera. So if you're off to the seaside, an underwater housing is a great addition to your kit bag.



## STEP BY STEP TAKE YOUR DSLR FOR A DIP

Ensure your housing is watertight and set up your camera for beach portraits in the surf



### 01 TEST WITH TISSUE

Before you put your DSLR in the bag, first put some tissue paper in, then submerge the bag. If the tissue stays dry then you know the bag is watertight. Place some tissue in the bag along with your DSLR – it'll be a good early-warning indicator if any water seeps in.



### 02 PREPARE YOUR CAMERA

Once your camera is in the bag it's tricky to access controls, so set it up beforehand. Our starting point was Manual exposure, 1/200 sec, f/5.6 and Auto ISO. You're better off making further adjustments with the Q menu and buttons, rather than trying to twist dials.



### 03 WATCH THE LENS

It's unlikely that the clear front cylinder will match up precisely with the front element of your lens, so watch for vignetting around the edges of the frame and hold the front plate to keep it central. Pop a sachet of silica gel in the bag to prevent the glass from fogging up.



### 04 SHOOT IN THE SURF

Get down low in the water to show the shape of the waves, or try half-submerging the camera (you can go completely under, although it's hard to see much in choppy, sandy waters). A reflector comes in handy on a sunny day for bouncing sunlight back into shadows.

**QUICK TIP!**  
Half-pressing the shutter is tricky through a bag, so set up back-button focusing in your DSLR's custom AF menus

## ESSENTIALS CAMERASKILLSNOTHETWATER:HDR



### 01 SPLASH THE CAMERA

Ask your subject to splash water at you. Lock focus beforehand, otherwise it might snap onto the water.



### 02 GO UNDERWATER

A housing can submerge completely, but this is best done in clear water, rather than a sandy beach!



### 03 REFLECTIONS

Shoot in the shallows and get down really low to the ground for interesting reflections in wet sand.



### 04 BREAKING WAVES

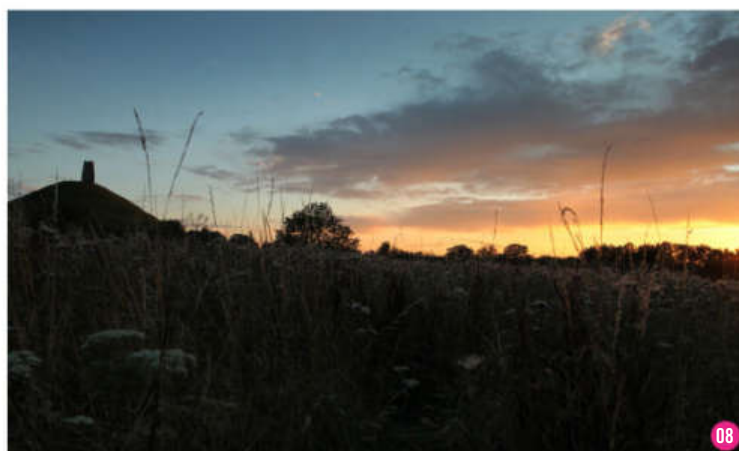
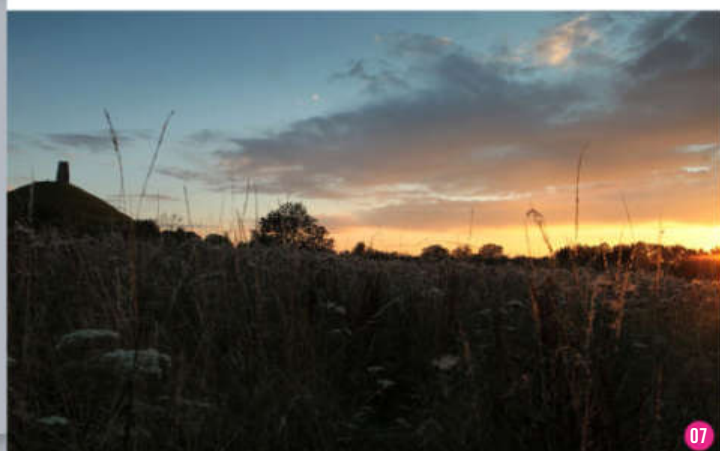
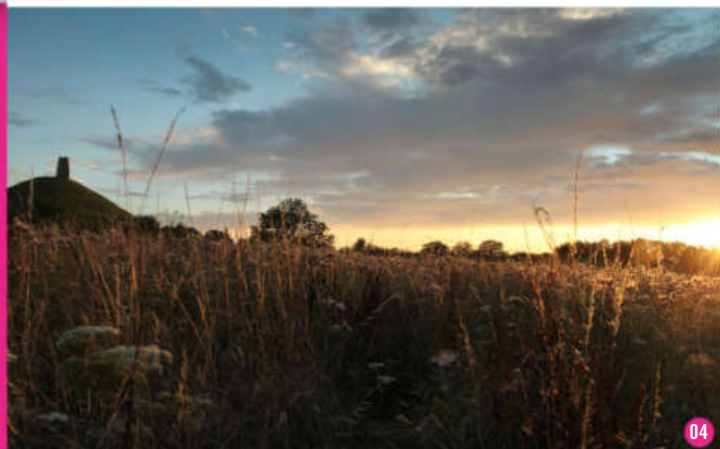
For a dynamic angle, sit in the surf and capture breaking waves as they head towards the camera.



### 05 ACTION POSES

Action shots work well. Ask your subject to run, jump, spin, dive and swim for a variety of poses.





### THE MISSION

Shoot a sequence of images and turn them into a time-lapse movie

#### Time needed

Shooting time plus two hours editing

#### Skill level

Intermediate

#### Kit needed

Intervalometer (or built-in interval shooting) • Tripod • Time-lapse software

# Make the time fly

Speed up time by shooting and editing a sunset time-lapse movie

**T**ime-lapse movies are a great way of recording the passing of time, by compressing an event that takes place over hours or even days – such as the movement of clouds across the sky, or day turning into night – into minutes.

Time-lapse photography essentially enables you to create a flip-book style video, by shooting images over a set period and then playing them back at movie frame rates. As videos are shot at a frame

rate of at least 24 frames per second, we need to shoot a lot of images to create a movie of useful length – for just a one-minute video at 24fps, for example, you'll need 1,440 images!

To capture the images we need to set our camera up to shoot at set intervals – so if we wanted to capture those 1,440 images over a period of two hours we'd need a photo every five seconds. Some cameras, like the EOS 7D Mk II, include an interval timer that will do this automatically; if your

camera doesn't have this feature you'll need a remote with an interval shooting setting, or a dedicated intervalometer.

We've used spot metering to keep the exposure consistent for our shots of the setting sun; it's advisable to keep an eye on your exposures, and use exposure compensation if necessary.

We're using Lightroom 5 to create our time-lapse movie; you can also use Photoshop CS6/CC, or one of the many free time-lapse programs that are available.



VIDEO ALSO ONLINE  
[http://bit.ly/pp\\_105\\_4](http://bit.ly/pp_105_4)

The Ultimate  
**Canon SLR**  
 Handbook Volume 4  
**VIEW THE VIDEO**

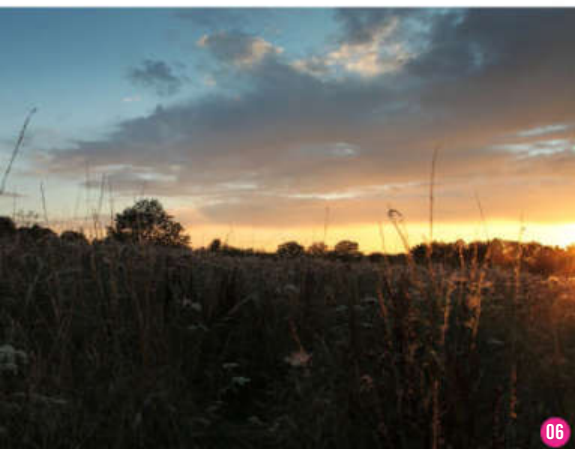
## PROJECT 9

# PREPARATION PLAN YOUR SHOOT

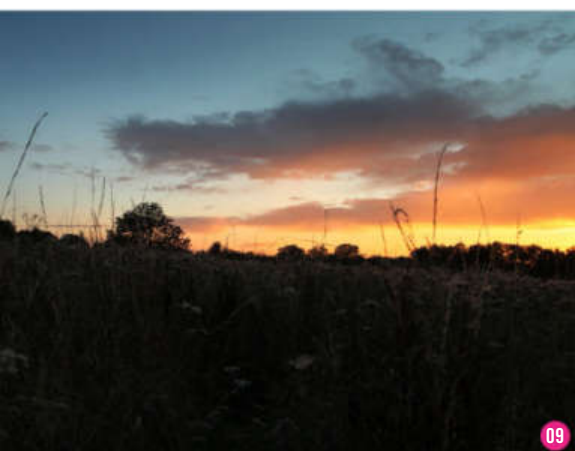
Things to check before heading out to capture your time-lapse images



03



06



09



### 01 COME RAIN OR SHINE

Checking the weather forecast is always advisable before shooting outdoors – and even more so if you're going to be sitting in one spot for a few hours.



### 02 FOLLOW THE SUN

Checking where the sun will rise and set at your location will help you plan your shoot. The Photographer's Ephemeris website and app can help you here.



### 03 CHARGE YOUR BATTERY

Make sure your battery is fully charged; a time-lapse shoot will take a long time, and will often require you to capture in excess of 1,000 images.



### 04 PREPARE FOR THE WORST

Whatever the forecast, make sure you're prepared for rain or falling temperatures. Take a cover for your camera, even if it's just a rain-proof jacket to drape over it.

## ESSENTIAL KIT EVERYONE NEEDS FOR DOING PERFECT TIME-LAPSCAPES?



### 01 TRIPOD

It's essential that your camera doesn't move throughout the lengthy shooting process, so use a sturdy tripod. Make sure it's on a solid footing, and that all the adjustments are fully tightened.



### 02 INTERVAL REMOTE

Unless your Canon DSLR has a built-in interval timer you'll need a remote control which includes an interval timer, or a dedicated timer called an intervalometer, which connects to your camera.



### 03 GRAD FILTER

If you're shooting over 1,000 images, bracketing your exposures will be time-consuming and will fill up your memory cards quickly – an ND grad filter will help prevent bright skies from blowing out.



### 04 MEMORY CARD

Make sure you have a large-capacity memory card or two, as this will enable you to capture Raw images or high-quality JPEGs. Remember to empty and format the cards first.



### 05 CALCULATOR

Use a calculator to work out your shooting intervals and ensure that you have enough images for your video. Divide the length of time you're shooting over by the number of shots you need.

# SHOOTING TECHNIQUE HOW TO CAPTURE YOUR IMAGES

How to shoot a sequence of images that can be easily combined to create a smooth-running movie

## INTERVAL REMOTE

We've used a Hama Timer Remote Shutter Release, which connects to your DSLR via a cable. The Hama remote features all of the shooting modes found in your camera along the bottom of its screen, plus, at the top of the screen, additional Delay and Interval Shooting options. Use the arrow keys to move between the functions, and the centre button to select them. Use the same controls to set the interval time, and press the play/stop button to begin shooting.



### 01 ACCURATE POSITIONING

Set up your shoot where it won't be disturbed, out of the way of passers by and sheltered from the wind. Use a compass with the Photographers Ephemeris app to work out where the sun will be.



### 02 ROCK SOLID

Set up your tripod, making sure that it can't move for the duration of the shoot; if necessary, open the legs wider for maximum stability, and hook your bag onto the central post to weigh it down.



### 03 CHECK YOUR CAPACITY

As a time-lapse video will be viewed on-screen, we don't need ultra-high resolution images. Shoot JPEGs or low-resolution Raw files depending on your camera and card capacity – ensure you have enough space.



### 04 EXPOSURE SETTINGS

Set your camera to Aperture Priority mode (Av) to keep the depth of field constant; your camera will adjust the shutter speed as the light changes. If you prefer to use Manual mode, use Auto ISO.



### 05 COVER THE VIEWFINDER

During long exposures the viewfinder can leak light and affect metering or cause blemished images. You won't need to use the viewfinder once set up, so cover it using the cap on your lens strap or with some tape.



### 06 TIMING IS EVERYTHING

Calculate how many images you'll need and how long you're shooting for, and set the interval timer accordingly. We set our remote to shoot every five seconds for just over an hour, giving us 800 images.



SHOOT A **TIME-LAPSE****TIME-LAPSE TREATMENT TIMELY SUBJECTS**

You can make time-lapse movies of all kinds of subjects and scenes...

**01 OPENING FLOWERS**

This popular time-lapse can take up to a week to shoot, depending on the flower. You'll need to set up your shoot in a quiet space with no air currents to prevent the flowers moving around; placing the stems in florist's foam will help to keep them still. The lighting needs to be constant too.

**02 DECAYING FOOD**

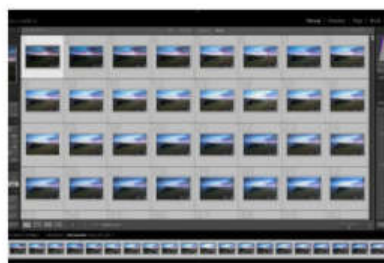
The timescale for this will vary depending on the food – you can save time by buying fresh food, such as fruit or bread, that's close to its sell-by date. As with flowers, set up the shoot with constant lighting in a location where the camera can be left in place for several days.

**03 DAY-TO-NIGHT CITY SCENE**

Another popular choice for time-lapse photography is a bustling city – as with our sunset this requires images shot at shorter intervals over a shorter period. Shoot from a high vantage point, use Manual shooting mode, and use Auto ISO to balance the exposures.

**EDITING CREATE YOUR TIME-LAPSE MOVIE**

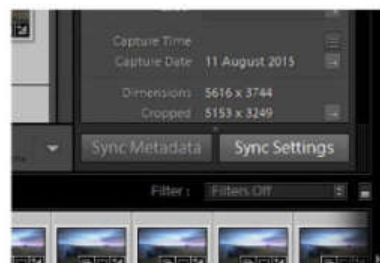
How to edit your time-lapse sequence and turn it into a video using Lightroom 5

**CREATE A COLLECTION**

Import your images, select all (Ctrl+A), and click the '+' icon on the Collections panel to create a new collection.

**EDIT YOUR IMAGES**

Select one image, go to Develop, and make any necessary edits, such as using the Spot Removal tool to erase lens marks.

**BATCH EDITING**

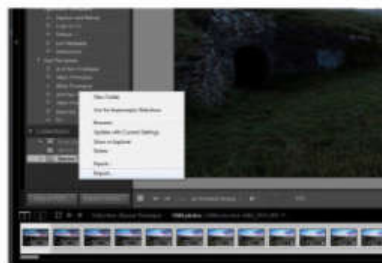
With one image edited, select all the images you want to change and click 'Sync Settings' to apply the edits to those images.

**TIME-LAPSE TEMPLATES**

To create a time-lapse using Lightroom 5 you first need to download Adobe's free time-lapse templates from the 'LRBplugins' website: <http://lrbplugins.com/shop/presets/lrb-timelapse-presettemplates>. In the LRB Timelapse folder there will be two further folders – you need 'Slideshow Templates> User Templates'. This folder includes options for a variety of frame rates per second, enabling you to choose how quickly your images are played back.

**FILTER YOUR IMAGES**

Scroll through the images and delete any that don't work in the sequence. Go back to Develop to alter individual images.

**IMPORT YOUR TEMPLATE**

Go to Slideshow view, right-click on the Templates panel, select 'Import...' and locate and import your template (see sidebar).

**EXPORT YOUR MOVIE**

Select the frame rate template you want; we used 25fps. Select 'Export video' and set the resolution for your screen; we used 1080p.

## PROJECT 10

## THE MISSION

Shoot and edit a multiplicity portrait by duplicating the same person over and over again

**Time needed**  
One hour

**Skill level**  
Intermediate

**Kit needed**  
Tripod • Props and costumes • Home studio lighting kit • Photoshop CC

# Mad hatter's tea party

As Alice celebrates her 150th birthday in Wonderland, we disappear down the rabbit hole to create a multiplicity fantasy portrait

**A multiplicity effect is an opportunity to create a playful scene by duplicating a subject several times.** It's a fun technique, involving a clever combination of shooting and Photoshop skills. To celebrate the 150th anniversary of *Alice's Adventures in Wonderland*, we've recreated the Mad Hatter's Tea Party, with the same person donning a variety of theatrical costumes to play each of Lewis Carroll's famous characters.

Whether you want to go all-out and create a bonkers scene like this, or just fill your sofa with identical buddies, the same technique applies. We keep the camera fixed to a tripod, then take a series of shots while the subject moves into different positions around the frame. As long as the lighting and exposure stays the same, it's easy enough to bring everything together in Photoshop.

We'll begin with the shooting part of the technique here, then show you how to piece the images

together over the page. This is simple enough, even for those with very basic Photoshop skills. We bring the images together on separate layers, add layer masks, then paint to hide or reveal the areas that we want. Because everything surrounding each figure is aligned, we don't need to be too precise (unless there are points where figures overlap, then we need to be more accurate). It doesn't take long, and introduces fundamental Photoshop features like layers and masks.

## STEP BY STEP SET UP YOUR SUBJECT

Discover how to prepare your camera and scene for a multiplicity portrait

### LEWIS CARROLL: AUTHOR, POET & PHOTOGRAPHER

Popular from the moment it was published in 1865, Lewis Carroll's *Alice's Adventures in Wonderland* continues to inspire with its imaginative cast of characters. Fascinatingly, as well as an author and poet, Carroll was an accomplished photographer who mastered the challenging wet-collodion process in the early days of photography. Carroll had his own studio and favoured taking portraits, many of children.



#### 01 A STEADY CAMERA

Use a tripod to ensure your camera stays still and in the same spot for each shot. This makes it easier to combine the images in Photoshop later. Take care not to move props or furniture between shots, either.



#### 03 CONSISTENT EXPOSURE

Exposure and lighting should stay consistent throughout, so set Manual mode and take test shots to determine the correct exposure. After focusing, set the lens to manual focus to prevent it searching.



#### 02 COMPOSE THE FRAME

Compose with plenty of empty space for your 'clones'. If you're using props and costumes, it can be helpful to do a quick dry-run or mock up a sketch beforehand, like this, to plan poses and characters.



#### 04 LIGHTING THE SCENE

Watch out for changes in lighting, especially if the sun dips in and out of clouds. To add a cinematic look we used a couple of home studio flash heads, one positioned for frontal light, the other to the left.





## TOP TIPS SIMPLE TECHNIQUES TO ADD TO THE EFFECT



### 01 DRESS UP

Costumes are an optional extra. But they do make the whole process a lot more fun, and give you a theme to run with. We hired a range of outfits from the wonderful Bath Theatrical Costume Hire.



### 02 MULTIPLY PROPS

It's not just people that can be multiplied, props can be too. An object, such as our out-of-focus blue flower, can appear as many times as you like. Simply fire off a shot for each new position.



### 03 SOFT FOREGROUND

When composing, try including out-of-focus foreground details like plants or tree branches to add depth. The apple tree here provides a natural frame for the image that draws the eye in.



### 04 DRESS THE SCENE

Multiplicity is a surreal effect, so why not make the scene look extraordinary too? Once we'd settled on a Mad Hatter's Tea Party theme, lots of props immediately sprung to mind.



### 05 TRY USING FLASH

On dry days, flash can work wonders outdoors, especially under a dark tree like this. We used a home studio kit, with two heads fitted with umbrellas, powered from a nearby mains socket.



# STEP BY STEP PIECE TOGETHER YOUR MONTAGE

How to merge all the characters into the scene with layers and masks in Photoshop CC

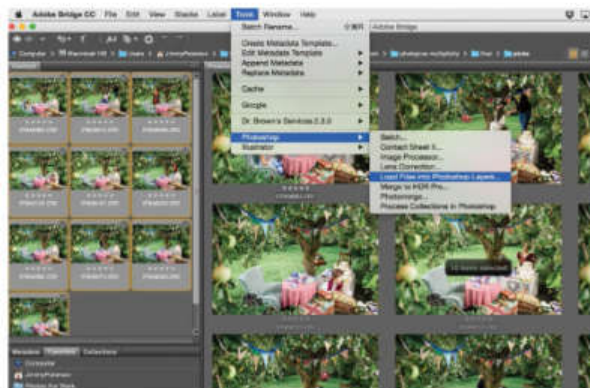
## IT'S ALL BLACK AND WHITE

When painting on layer masks, a quick way to switch between foreground and background colours is to hit the X key, to swap between black or white and thus mask or reveal the layer below, respectively. For this to work the foreground and background colours need to be set to solid black and pure white – if not, simply hit D to reset them.



### 01 TONE AN IMAGE

Select the best poses by star-rating images in Bridge. Once done, right-click any image and 'Open in Camera Raw'. Use the Basic panel controls to improve tones, as shown. Click Done to exit back into Bridge,



### 02 COPY & PASTE ENHANCEMENTS

Right-click on the image. Choose Develop Settings> Copy Settings. Press Ctrl+A to select all, right-click and go Develop Settings>Paste Settings, then go to Tools>Photoshop>Load Files into Photoshop Layers.



### 03 ADD A MASK

Go to the Layers panel (Window>Layers) and give each layer a suitable name. Highlight the top layer and Alt-click the 'Add Layer Mask' icon in the Layers panel to add a black mask that completely hides the layer.



### 04 PAINT TO REVEAL

With the layer mask thumbnail highlighted, paint with white to reveal the hidden figure and blend them with the figure on the underlying layer. Grab the Brush tool, set colour to white, then paint over the hidden figure.



### 05 WORK DOWN THE LAYERS

Work down the layers using the same technique to firstly hide a layer, then reveal the part you want (leave the bottom layer unmasked). Swap layers around if you want one person in front of another.



### 06 FINE-TUNE THE MASKS

At points where figures overlap, identify which layer is on top, then highlight the mask thumbnail. Zoom in close, use a small brush tip and paint with black to hide parts of the layer until the edges look perfect.



## TAKE IT FURTHER IT'S ALL IN THE DETAILS...

With layers and masking it's easy to add detailed effects that add to the story



### 01 INTERACTING CLONES

It takes a little planning to get your 'clones' interacting with one another. If a clone gestures one way, line up the next shot to match it. With a little digital trickery we can even add in extra details like the pouring tea here – to do this we copy in the tea image, then transform and mask.



### 02 STACKED CUPS

Precariously stacked cups can be created by shooting them in stages, holding each section of cups by hand. As long as you take care that the hands don't obscure the object, it's easy enough to blend the stack together with layer masks in the same way as everything else.



### 03 RABBIT'S HEAD

To give our rabbit more personality we can add proper eyes. An easy way to do this is to copy and paste eyes from a real person (in keeping with the theme, we used our model's eyes), then use masks to blend the edges. We also shaped the head with the liquify filter to make it more rabbit-like.

## WHY NOT TRY? SUBTLE APPROACHES TO MULTIPLICITY

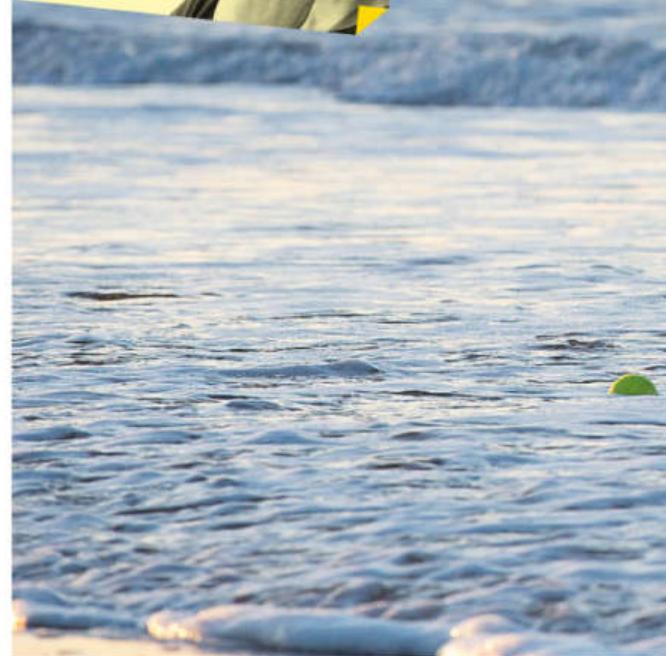
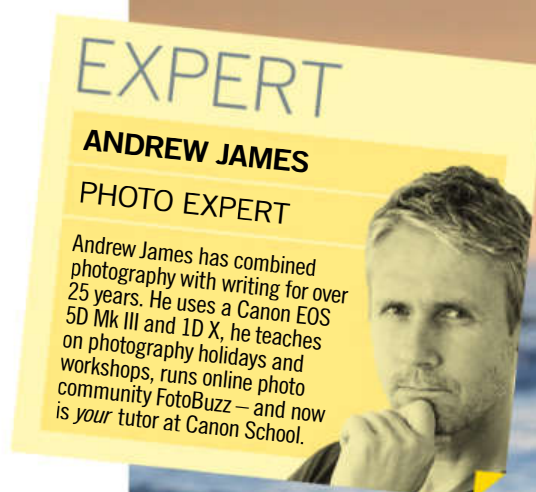
Rather than a complicated, crowded scene, set up a simpler portrait shot with fewer characters

**ONE** option when making a multiplicity portrait is to fill the scene with characters and props, or to put it another way, the 'chuck everything in bar the kitchen sink' approach. This what we did for our main image on the previous page. But why not try a subtler approach to the subject? Here, by using a long focal length to compress the angle of view and a wide aperture to keep depth of field shallow, we can create a more discreet effect that at first glance looks almost normal. We use the same technique as before, and make sure we lock off the focus by switching it to manual focus.

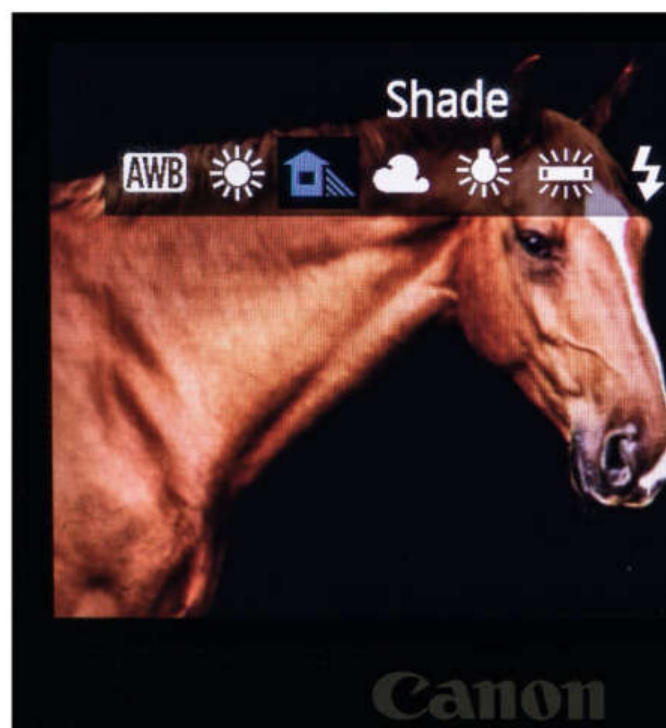


# Canon school

The photographic journey	94
How to handle your Canon DSLR	100
The importance of aperture	106
The need for shutter speed	112
Understanding ISO	118
In-camera metering	124
The importance of white balance	130



112



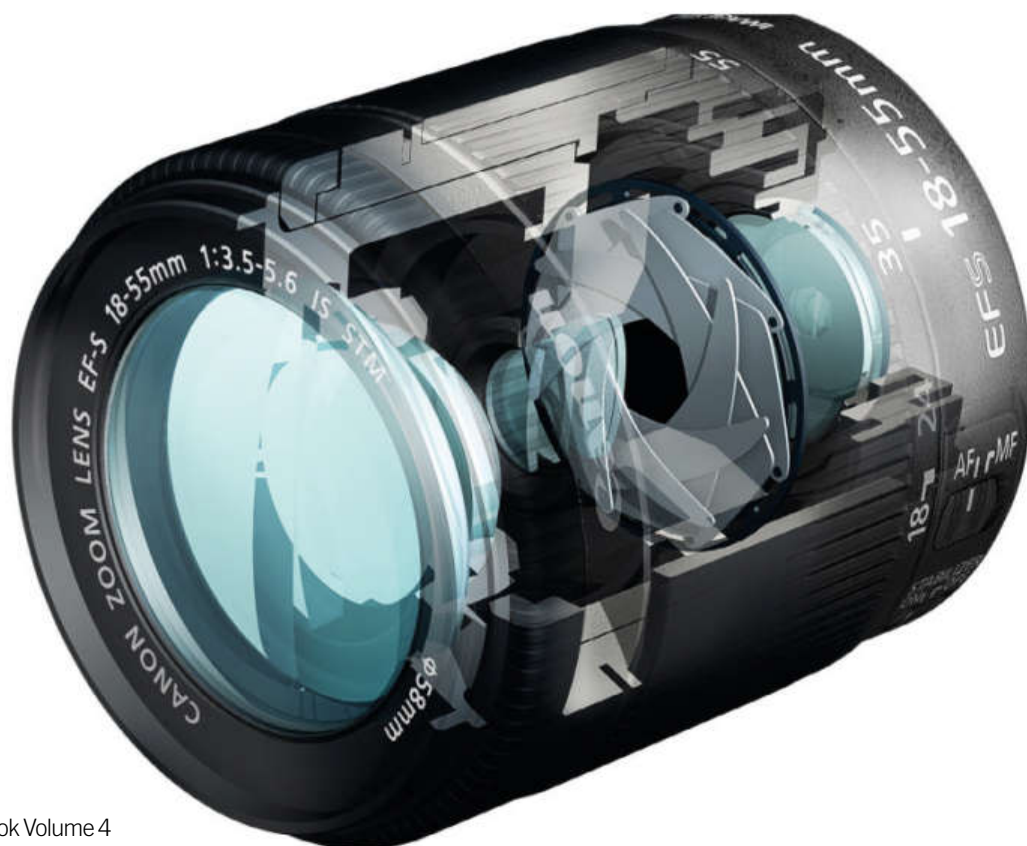




94



130



106

# The photographic journey

From conception to completion, we explain the fundamentals of taking a photograph

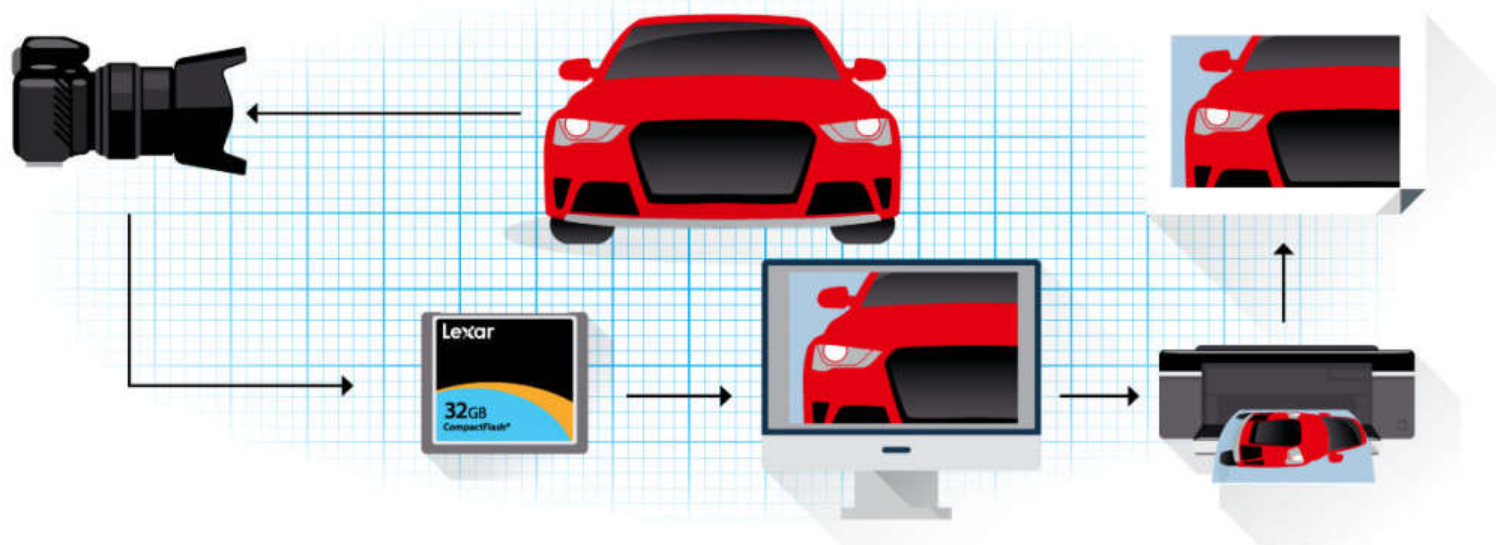
**To kick-start this seven-part Canon School course, let's look at the most fundamental aspect of owning a DSLR – making an exposure.** After all, this is what we photographers do time and again. We visualise an image, press the shutter button on our Canon DSLR,

the shutter opens to expose the digital sensor to light, and the image is recorded.

It sounds so simple when put like this, but exposure can frequently trip us up, and the more creative we want to get, the more complicated it appears to be. The fact is, if you master a few simple factors with your camera then

what seems unfathomably complex will suddenly appear as clear as spring water. It all revolves around what we've called 'the exposure triangle' – which includes three main elements: aperture, shutter speed and ISO. We'll get more into those settings over the page. For now, let's look at the picture-taking process.

It starts by light entering the camera and registering on the light-sensitive sensor at its heart. It is then stored on a memory card. The digital files are transferred from the card to a computer and finally, we hope, printed to create a wonderful photograph that can be framed and hung on the wall for all to enjoy.



## CANON DSLR & LENS

Each relies on the other: the camera houses the sensor on which the exposure is captured, but the lens is needed to harness the light. By altering the size of the hole through which the light is passing you can change the look of your images by increasing or decreasing areas that appear sharp.

## MEMORY CARD

The memory card is your digital film – and the bridge between camera and computer. All current entry and enthusiast-level Canon DSLRs take SD cards, though the 7D Mk II, 5D Mk III and 5DS are also compatible with CompactFlash cards. However, the EOS 1D X takes CompactFlash only.

## COMPUTER

Raw files are like digital negatives that first need processing, but the computer replaces the darkroom. You can use Canon's Digital Photo Professional, or opt for Raw software such as Adobe Lightroom or Adobe Camera Raw that's part of Photoshop CC/Elements.

## PRINTERS

Replacing the high-street lab, online print companies are relatively cheap and easy to use for everything from a basic print to a cushion, or you can opt to print at home on a bespoke photo printer. Canon's PIXMA range of printers produce superb results, as do brands like printer-specialist Epson.



## BASIC &amp; CREATIVE ZONE

# Understanding the Mode dial

Why moving from Basic Zone into Creative Zone will improve your photography

**0** n the top of your EOS (unless you own a 1D X) is the Mode dial. This circular wheel gives you access to all the camera's exposure modes.

The automatic exposure modes are found in the 'Basic Zone', and are represented by pictorial symbols – a mountain for Landscape mode, a face for Portrait mode and so on. But

your only control is switching to each mode in the first place; after this the camera takes over, so what it decides is the 'correct' combination of aperture, shutter speed and ISO is what you get.

Switch to Sports mode, for example, and the camera judges the lighting conditions and comes up with an 'appropriate' fast shutter

speed for a moving subject, possibly pushing ISO higher to achieve it. It will also set the camera's AF mode to AI Servo, Drive mode to Continuous shooting, and make all AF points active, all of which help get a sharp shot of a moving subject.

So why would you want to work any other way? Well, your camera will have done an okay



job in getting an acceptable shot. But you could undoubtedly do better working in one of the semi-auto or full manual exposure modes, otherwise known as the Creative Zone...

## Creative Zone

Take total control of your camera by selecting a semi-automatic – or full manual – exposure mode

**CREATIVE ZONE** modes (M, Av, Tv and P) not only enable you to take partial or total control of the exposure, dialing in the shutter speed and/or aperture you desire, but also aspects such as ISO, Drive and AF settings, unavailable in Basic Zone modes. They're available on every EOS (on more advanced models, they're the *only* modes available). Here's an outline of the Creative Zone modes...

### Manual (M)

In manual mode you physically set both the shutter speed and aperture. If you get either wrong it will adversely affect your exposure, so this is a setting to use only when you are 100% comfortable with how exposure works.

### Aperture Priority (Av)

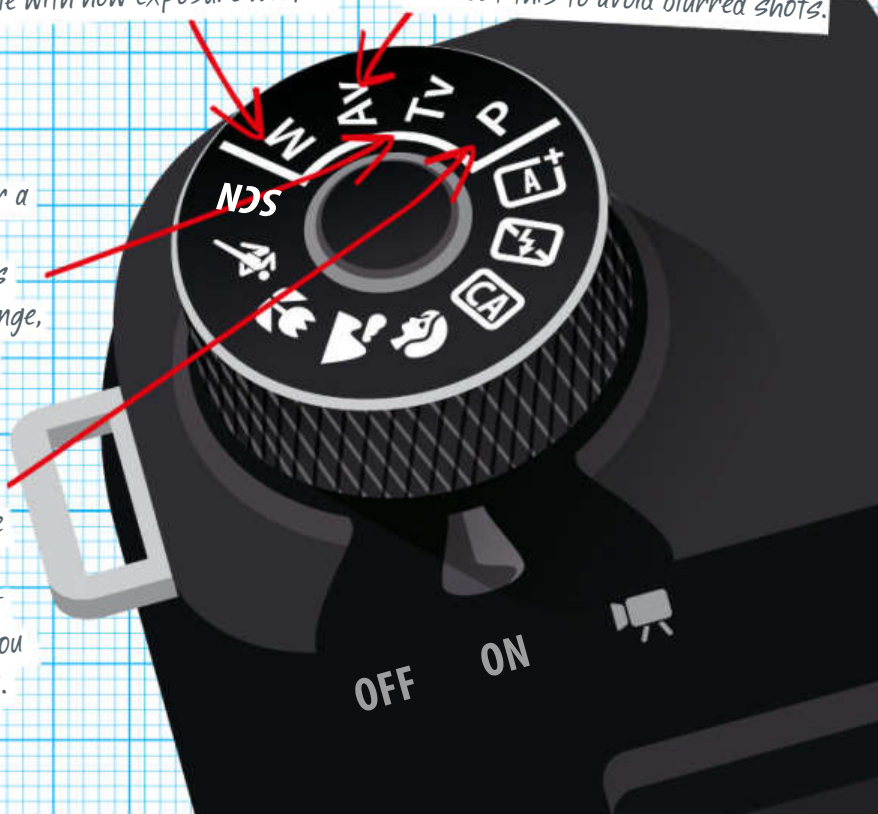
You choose the aperture and your DSLR selects the shutter speed. Av mode is good when you want to control depth of field, but watch the resultant shutter speed – you may need to increase ISO to boost this to avoid blurred shots.

### Shutter priority (Tv)

You select the shutter speed and the camera attempts to set an aperture for a correct exposure. But look out for a 'blinking' aperture number – this means the exposure is beyond the aperture range, meaning under- or overexposed shots.

### Program (P)

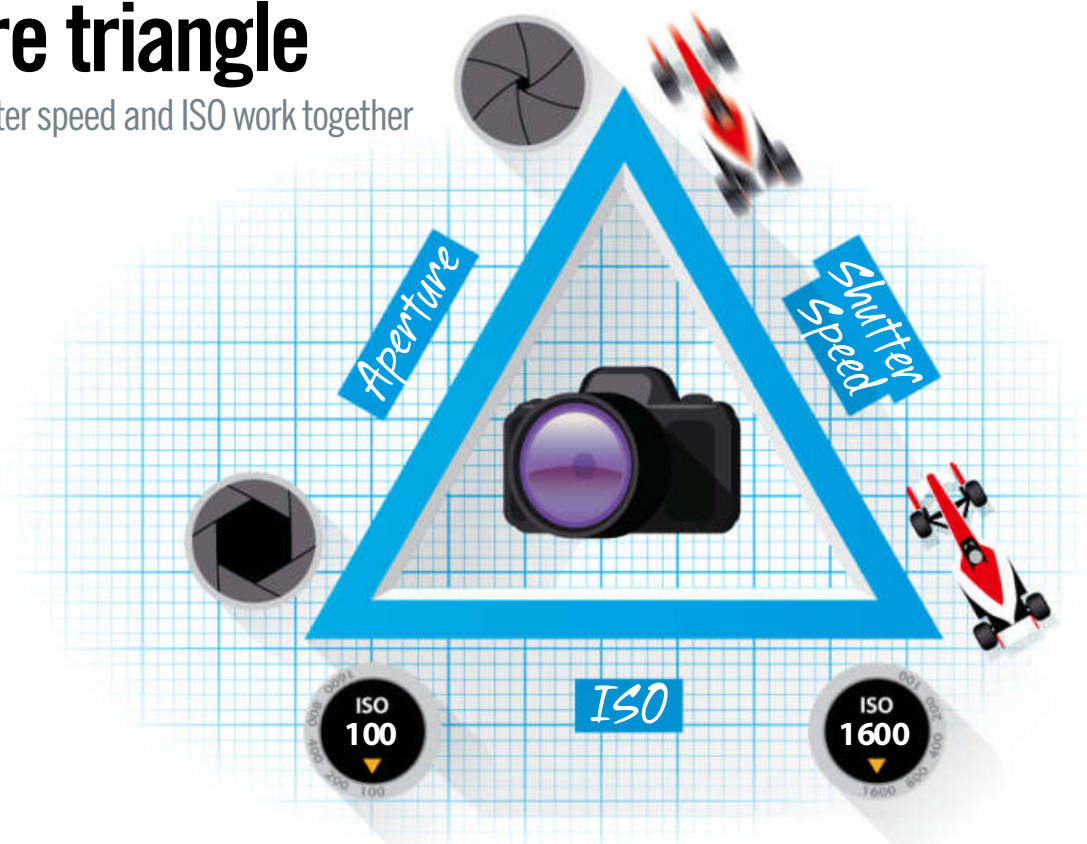
The camera sets both aperture and shutter speed. However, you can change the exposure for a wider aperture or faster shutter speed, for example, but both settings are changed in unison. You can also change ISO and focus modes.



# The exposure triangle

Discover how aperture, shutter speed and ISO work together

**T**o take the next step with your Canon photography, it's absolutely essential to understand the relationship between the three main elements that come together to make the exposure. One way of remembering the three key ingredients is the exposure triangle, with aperture, shutter speed and ISO on each of the three sides. Each decision you make in terms of aperture, shutter speed and ISO will have an affect on the look of your image. This is why it's creative! We will be covering each one of them in much greater detail in the future but here is a run through the basics...



## Understanding exposure one stop at time

The key to creative photography is understanding how changing one side of the triangle affects the others



### Aperture

**AT ITS MOST** basic the aperture is simply the hole through which light enters. Different aperture settings alter the size of the hole and let in more or less light. The aperture scale is measured in f-stops, but the logic can be rather baffling because it is an apparently random string of numbers that goes f/2.8, f/4, f/5.6, f/8, f/11, f/16. At its simplest level, the smaller the f-stop (f/2.8 or f/4) the larger the aperture and the more light that comes in. The greater the number (f/11 or f/16), the smaller the aperture and the less light comes in.

### Shutter speed

**THE SHUTTER SPEED** is the time the shutter is open to allow light through to the sensor. So if the aperture is the hole through which the light is travelling, then shutter speed is the period for which that hole remains open. Shutter speed is also measured in stops, but is easier to understand because each f-stop is roughly double its neighbour, and is measured in seconds (more commonly, fractions of a second), and goes 1/8, 1/15, 1/30, 1/60, 1/125, 1/250 sec. The smaller the fraction, the faster the shutter speed.

### ISO

**THE ISO SETTING** denotes the sensitivity of the camera's sensor. It, too, is measured in f-stops, and doubles as it moves along the scale – 100, 200, 400, 800 and so on. The beauty of the ISO setting on a digital camera is that it can be changed from shot to shot as conditions dictate – in the days of film you were stuck with a fixed sensitivity for the whole roll! When light levels are low you can increase ISO to lift shutter speed to avoid camera-shake issues, however, the higher the ISO, the more the image will be degraded by 'noise'.

### Key to creativity

**EVERY IMAGE** taken with a DSLR is an equation of aperture, shutter speed and ISO. They enjoy a reciprocal relationship and, for a given exposure, if you increase one element of the exposure triangle by one stop, then you will also have to decrease one of the other parameters by one stop. For example, if camera is set to 4 secs, f/16, ISO100, and you decide to reduce the aperture to f/22, you will also have to either increase the shutter speed to 8 secs or ISO to 200 to compensate.



## EXP COMPENSATION

# Making the shot lighter or darker

Learn when you'll need to take control of your exposures for the best results

**W**hen shooting in the semi-auto Av or Tv modes, the camera takes a meter reading of the scene then sets the other side of the exposure triangle for a 'standard exposure' to match your ISO setting. But

what the camera thinks is the perfect exposure might not yield the results you're after. For instance, when shooting a portrait with sun behind them the camera might expose for the brighter sky, plunging your subject into darkness. Or when

photographing a sunset, the camera will set an exposure for a balanced scene, rather than the dramatic silhouette you had in mind. To get around this, you can brighten or darken your photo using exposure compensation. Dialing in

positive compensation brightens a shot, while negative compensation darkens it. Exposure compensation is also applied in 'stops' (usually thirds of a stop) and will improve your results when you're faced with challenging lighting conditions.



**+1 stop**

Manually brightening the exposure here as ensured the portrait subject's face isn't rendered too dark



**Level**

No exposure compensation was needed as this scene doesn't have high-contrast areas



**-1 stop**

Manually darkening this shot has made sure the sunset isn't bleached out

## Picture styles

Apply in-camera processing to match your subject, from detail-rich landscapes to flattering portraits

**JPEG IMAGES** can have different 'picture style' parameters applied to them and, if you regularly shoot JPEGs to save yourself processing time, this is definitely worth exploring. For example, setting the Landscape picture style boosts the greens and blues in the image, and sharpens detail, while the Portrait picture style will accentuate skin tones and apply more moderate sharpening to keep complexions soft. You can further fine-tune the

Sharpness, Contrast, Saturation and Colour Tone settings of picture styles, and it's worth experimenting to get the look that you like. You can also create your own user-defined picture styles, or download them.

When shooting in Raw, the preview on your camera's LCD is, in fact, a JPEG, complete with picture style processing, but the actual Raw image data will be unaffected. For a closer rendition of the Raw image, set the Neutral or Faithful picture style.



**Neutral**



**Portrait**

The picture style has a big impact on your images – if you shoot JPEG. If you shoot Raw, you can change the picture style in DPP afterwards

# Exposure assessment with histograms

Discover how the little graphs on your Canon DSLR's LCD can help progress your photography

**W**hen it comes to assessing an exposure, we've never had it so good. Not only do DSLRs give you the instant comfort of the LCD screen, they also have incredibly useful histogram graph. If you ignore histograms, then you're not using the assessment powers of your camera enough.

The brightness histogram is accessed by hitting the INFO button when you have an image displayed on the LCD. This graph is a representation of the combined red, green and blue tones that make up your image, running from 0 (pure black) on the left to 255 (pure white) on the right. The most important thing to avoid is 'clipping' the histogram, where

the tones in the graph are bunched flat at the left (underexposed) or pushed flat to the right (overexposed). If the graph is clipped either end, use exposure compensation to reign it in. If the histogram is clipped at both ends, then you need to judge whether it's most important to have some parts of the scene over- or underexposed.

Press the INFO button again to display the RGB histogram, which displays the spread of tones in the individual colour channels. However, the brightness histogram is generally the most useful.

Enabling the Highlight Alert warning provides a helpful indicator that your exposure needs looking at; overexposed areas flash black and white.

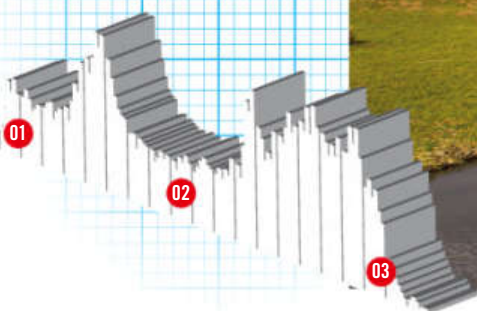
## Histogram explanation

The histogram on your Canon's LCD shows the tonal range of your images across the graph like so...

**Shadows:** Left side

**Midtones:** Middle area

**Highlights:** Right side



## Live View and Exposure Simulation

See your photo *before* you hit the shutter to take guesswork out of exposure

**CANON DSLRS** offer Live View shooting, and this can prove very useful when assessing exposure. Live View isn't suitable for every sort of photography, because it isn't as quick to focus on your subject, but where AF speed is less critical, such as when shooting landscapes, then Live View is an option to gauge exposure accuracy.

In Live View, your camera operates with the mirror flipped out of the way, and the image you see on the LCD is fed 'live' from the camera sensor, giving an accurate representation of the image that will be captured. Putting the camera in Live View and seeing how the scene lightens or darkens as you change elements of the exposure triangle

– shutter speed, aperture and ISO – is a really good exercise.

In some EOS DSLRs, such as the 5D Mk III and 7D Mk II, you will need to enable Exposure Simulation via the menu for the LCD to show your exposure changes; if this is disabled then the screen will remain at a constant brightness, no matter how you alter



the exposure. You can also overlay the brightness histogram onto the Live View image. Simply press the INFO button until it appears on the screen.



## CHOOSE YOUR SETTINGS

# Decision-making when you shoot

Every shot is different. Here are the decisions we had to make when shooting two very different subjects...

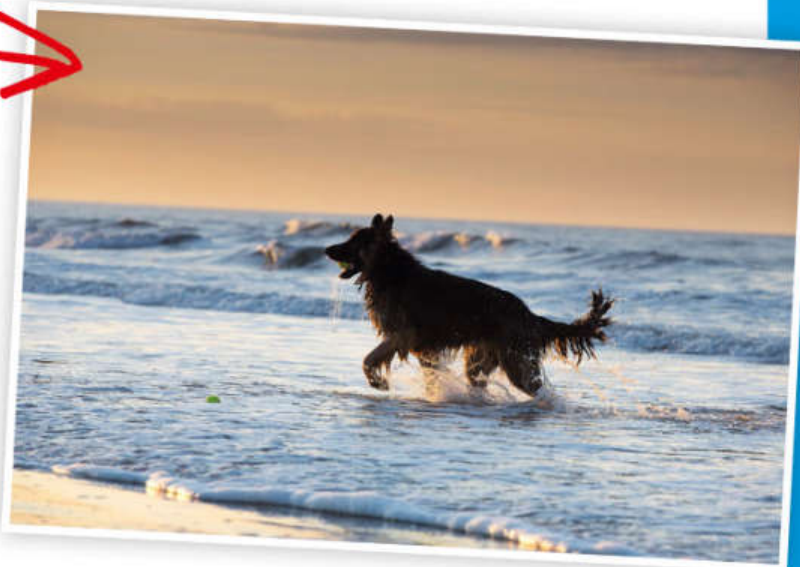
## Backlit dog (active)

**Exposure details:** 1/500 sec, f/4, ISO800

**Conditions:** Late evening, sun setting behind the subject.

**Subject considerations:** The subject is very active and we need to ensure the dog is pin-sharp in relatively low light. Handholding is our only option, because the dog is moving.

**Settings:** Switch to Tv, select a fast shutter speed of 1/500 sec and check the aperture chosen. But at f/4, our lens's widest available aperture, the aperture number is blinking, indicating the exposure will not be correct. So we push ISO up from 100 until it stops blinking; this is three stops higher, at ISO800. To ensure accurate focusing we switch AF to AI Servo and Drive mode to High-speed Continuous.



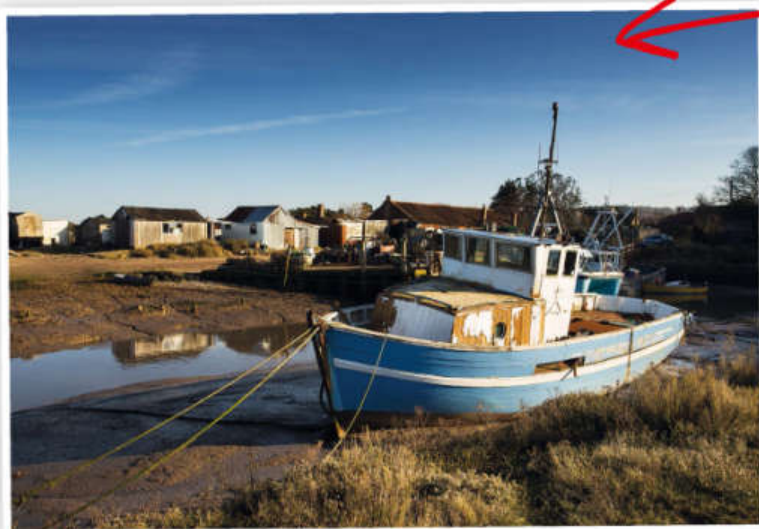
## Landscape image (static)

**Exposure details:** 1/30 sec, f/16, ISO100

**Conditions:** Early evening sunlight falling onto the subject.

**Subject considerations:** The subject is static, so shutter speed is not the primary consideration here. However, we want to ensure plenty of depth of field.

**Settings:** Switch to Av mode and set aperture to f/16. We select the lowest ISO of 100 for maximum image quality; we then get a shutter speed of 1/30 sec. Handholding is not advisable at this speed so, to avoid shake, we put our DSLR on a tripod. For precise focusing we switch to Live View and focus manually, magnifying to 10x view to check sharpness.



## School tip My Menu

Access often-used functions at super-quick speed

**USING YOUR** EOS camera's menu correctly is a good habit to get into because it means you can make important changes efficiently, leaving you free to concentrate on getting the shot. Furthermore, you can store functions that you regularly use in the My Menu option. Here, you can set up to six different functions that you want to have access to quickly and

they'll always be there, as long as you're operating in one of the Creative Zone modes. For example, if you are a landscape photographer and regularly want to enable or disable Mirror Lockup, register it to My Menu. Once you have your six most useful functions registered, you can even put them into a specific order to help you get to them even quicker.



## Part 2

# How to handle your Canon DSLR

Learn how to hold your EOS DSLR properly and get set up for sharper shots

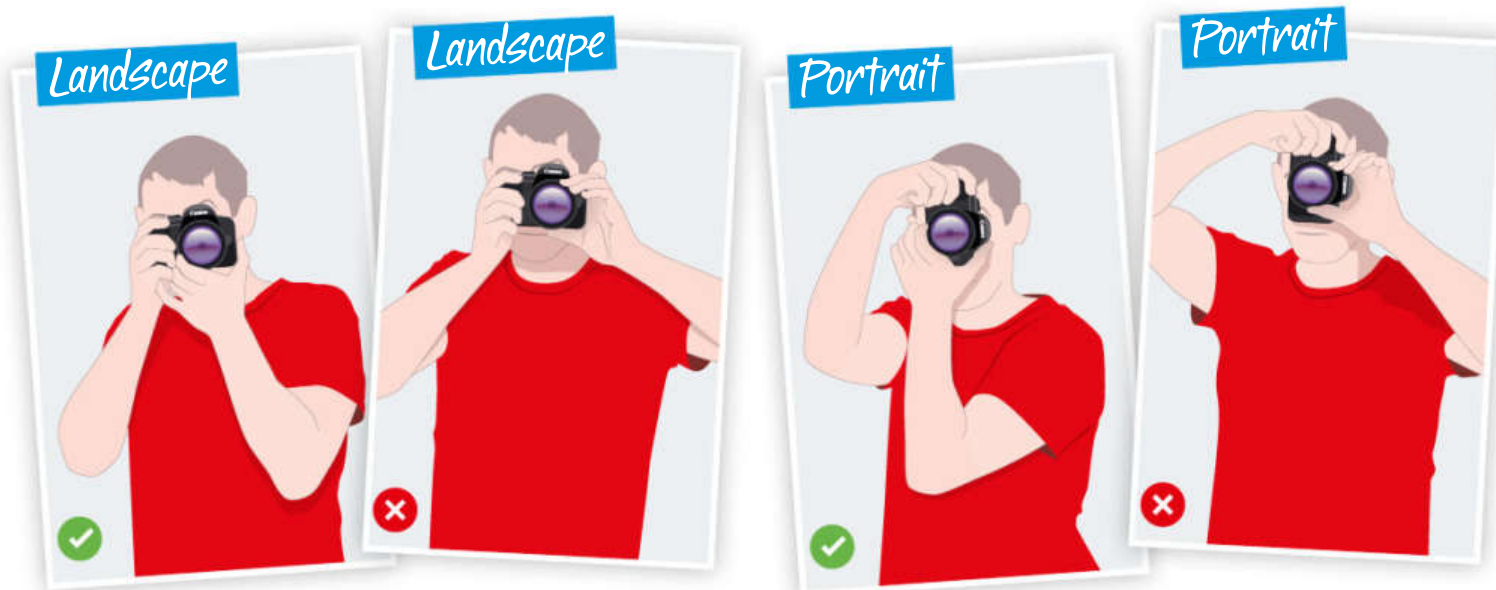
**B**asic handling is one of the most fundamental but often overlooked skills, but it's important to get right because poor technique will have a detrimental effect on your photography.

You must think about the position of your whole body, especially your arms and elbows, when taking a shot. When you get it right, you will take sharper photos simply because there is less chance of camera movement ruining a shot, particularly at slower

shutter speeds. Think of it as the image stabilization system that you don't have to pay anything for!

It's not always possible, or desirable, to use a tripod, so good handholding will make a difference to the number of shots you get acceptably sharp.

So even if you think you are holding your DSLR perfectly, it's worth giving your handling technique a quick MOT. Take a look at yourself in the mirror with the camera to your eye; you might be surprised to find you have fallen into some bad handling habits!



## Shooting in landscape orientation

**HOLDING THE CAMERA** for a horizontal (landscape) shot is the easiest to get right and the most frequently used. Your right hand needs a firm but relaxed hold on the camera grip, with your finger on the shutter button. Your right arm must be tucked in so the inside of the upper arm is flat against your body. Your left hand needs to support the camera and lens combination from underneath, again with your arm neatly tucked into the body. If using the viewfinder then lean forward slightly so the eyecup rests against your eyebrow. In this position you are a stable support system and can swivel to follow a subject, keeping the camera on the same axis all the time.

## Shooting in portrait orientation

**THERE WILL BE** many times when you shoot vertically (portrait), but as soon as you do the camera feels awkward because it has been designed for use in landscape orientation, so the shutter button moves to a more difficult position. It feels wrong because you have to bend your wrist to reach it while trying your best to keep your elbow down. It is impossible to tuck your arm in completely so just keep it as neat and vertical as you can. One simple solution is to turn the camera around so that the shutter button is at the bottom rather than at the top; with the camera like this you can tuck both arms flat against your body again, so you have a more stable position to photograph from.



**BASIC HANDLING**

# Get a grip

Improve comfort and camera control for upright shooting

**Battery grip**

**I**f you've tried holding your camera in the portrait position but still don't feel comfortable or stable then investing in a battery grip may be worthwhile. Not only will this give you increased shooting time if you use it with two batteries simultaneously, but more importantly it will make a big difference to handling when shooting vertically.

Not only does a battery grip have a shape that's easier to hold in portrait format, but

it positions a second shutter button on the top-front corner, exactly where your finger rests, so there is no wrist-bending required to reach it. Other controls are replicated on the battery grip, including AE Lock, AF point selection and the exposure compensation button. Overall, the use of a battery grip simply enables you to hold and shoot vertically much more comfortably and effectively.

It's an additional cost as a battery grip doesn't come



Canon DSLRs (only built in on the 1D X) and it also increases the size and weight of your camera, but you don't have to use it all the time as it's easy to take off and put on, screwing into the tripod mount socket.

Canon make battery grips for most models and there are also plenty of third-party options available, too.

# Over the shoulder shooting

How to steady your camera in low light situations

**W**hen light levels drop, fast shutter speeds become more difficult to achieve and there is an increased chance of camera shake. With a DSLR and standard kit lens you have to be very wary of camera shake at shutter speeds below

around 1/125 sec. Using image stabilization (if your lens has it) and bracing your body against anything solid, you can shoot at slower speeds with less risk of camera shake, but a lot will depend on how steady you are.

To compensate you can increase the ISO and open the

aperture on your lens as much as possible, but even then you may, in extreme situations, find yourself shooting at slower speeds than recommended.

In these circumstances, one trick I use is to rest the camera on my left shoulder. I hunch my shoulder slightly to raise the

viewfinder to eye level then grip my right wrist with my left hand to form a solid unit. It makes for a steady position, even if it looks a bit odd!

But note that a moving subject will look blurred at slow shutter speeds, no matter how steadily you hold the camera.



Increase the ISO, open up the aperture and use the 'shoulder hold' when light levels are low

**Shoulder hold**

# Using the electronic level

Activate the in-camera level display for straight horizons

**S**ome tripods have built-in spirit levels, or you can buy slot-in hotshoe bubble levels to help you take a straight shot. However, more advanced EOS models have an in-camera electronic level display that can be called to your assistance.

Press the INFO button twice and it appears on the rear LCD. A red line indicates the camera

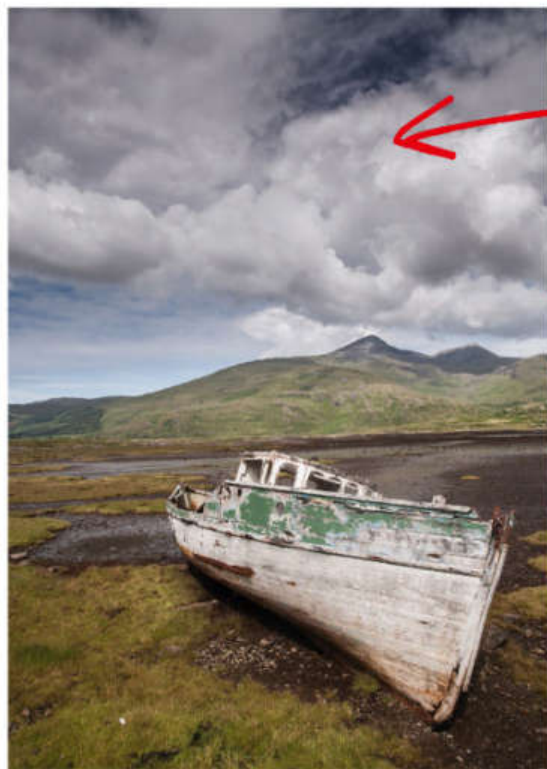
is not level and the markings within the grey central circle tell you by how much, as each one shows a 1° variation. By tilting the camera's position fractionally, until the red line turns green, you can be certain your image is level.

Using this while handholding the camera isn't ideal because you have to take your eye away from the viewfinder to look at

the LCD. It's better to use this in conjunction with a tripod; once you have a green line you can lock the tripod knowing everything is correctly aligned.

The new EOS 7D Mark II offers an electronic level display in the viewfinder itself – this is a different display to the electronic level on the back LCD, and once enabled you

can keep it visible in the viewfinder the whole time, making it much easier to know when your shot is level when shooting handheld because you don't have to move the eye away from the viewfinder.



## Not level

*An otherwise well-composed shot is spoiled by an uneven horizon that's off-kilter by just 2°; fixing this in Photoshop would lose vital picture info at the edges*

## Level

*Here, composition was sorted with the camera on a tripod and the electronic level activated as a final check to ensure the horizon was perfectly straight*



## The hidden viewfinder level

Activate a viewfinder level in 5D Mark III and 1D X

**YOU CAN** access a viewfinder level on the 5D Mark III and 1D X, using the squares normally used for AF, but it's not the most intuitive system. Go to Custom Controls and assign one of the available buttons to it. For example, if you don't use the DoF preview button much, you can reassign it to activate the electronic level.



## Level with Live View

**IT'S ALSO** possible to use the electronic level in Live View mode. Simply press INFO a few times and it will appear at the centre of the screen, overlaid on the live image. Although it is reduced in size for Live View, it still gets in the way when you are working out image composition, so it's best used as a final double-check that your horizon is absolutely level when you're relatively happy with your framing, then turn it off.

## Level no show?

**IF YOU** are an owner of a Canon camera model that has an electronic level (which includes the EOS 60D, 70D, 5D Mk III, 6D, 7D, 7D Mk II and 1D X) but it doesn't show up when you press the INFO button twice, make sure it is activated by going into the Settings menu (with a spanner symbol) and scrolling through until you find the 'INFO button display options'. Select this and ensure Electronic Level is ticked.



**FULL-FRAME vs APS-C**

# Sensor size and the crop factor

Understand the difference the dimensions of your camera's sensor makes

**A**t the heart of your Canon EOS DSLR lies either an APS-C or full-frame CMOS sensor.

Most entry-level and enthusiast cameras, like the 70D, 7D Mk II, 760D and 100D, have an APS-C sensor – the term is derived from 'APS Classic' film,

which is close in dimensions to APS-C sized sensors, at 22.2x14.8mm.

This is considerably smaller than the full-frame sensors found in high-end cameras, such as the 6D, 5D Mark III and 1D X. It's called 'full-frame' because it shares the same

dimensions as a traditional 35mm film negative; 36x24mm.

The smaller size of APS-C has one major effect on your photography – crop factor. The focal length of lens is magnified by a factor of 1.6x; so a 35mm lens effectively becomes a

56mm lens. The crop factor is good news if you want extra reach on long lenses for sports or wildlife, but not so good when it comes to shooting big scenes; although there are plenty of ultra-wide APS-C lenses that will enable you to capture large landscapes.



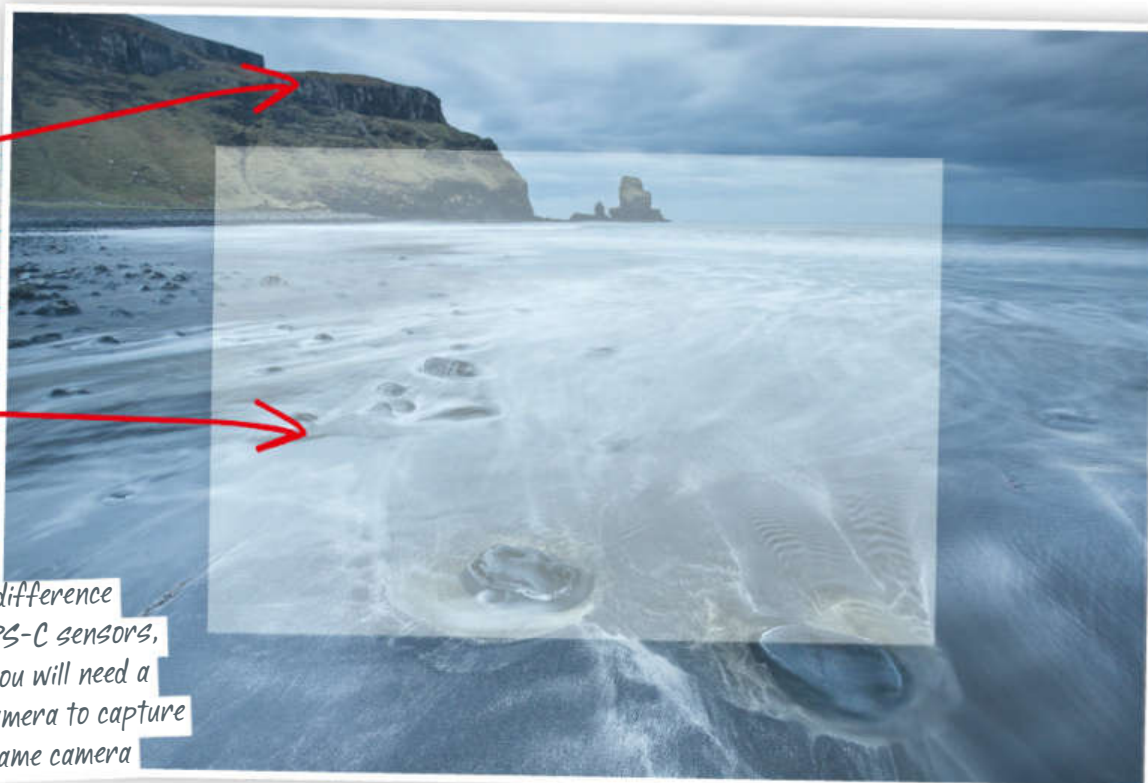
Full-frame



APS-C crop

## Crop factor

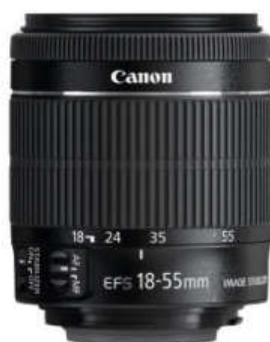
There is quite a large size difference between full-frame and APS-C sensors, so for a landscape image you will need a wider lens on an APS-C camera to capture the same area as a full-frame camera



## EF vs EF-S

Which lens for crop cameras?

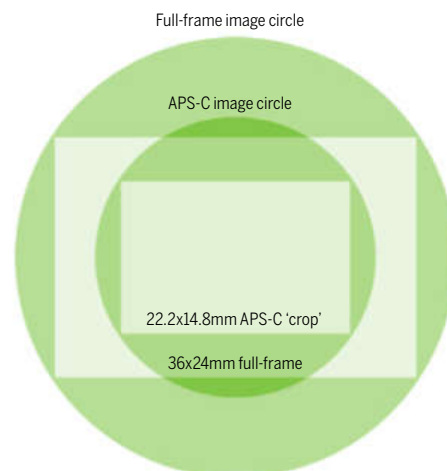
**CANON HAS** developed a range of EF-S lenses specifically for APS-C sized cameras. They are generally smaller and lighter than comparable focal length full-frame (or EF) lenses, as they produce a smaller image circle. Full-frame cameras cannot use EF-S lenses because, not only would an image taken with them be compromised by the size of the smaller image circle, but it could potentially damage the mirror as the lens sits further back into the body. You can, however, safely use EF lenses on APS-C bodies.



Canon EF-S  
18-55mm  
f/3.5-5.6 IS STM



Canon EF  
24-70mm f/2.8L  
II USM





# Another dimension

Try using the alternative crops on your camera

**A** **spect ratio is simply the width relative to the height of an image.** The default aspect ratio of all Canon DSLRs is 3:2, so if you shoot with the camera set to this you will be using all the sensor's size, no matter how many megapixels your EOS has, or whether you have a full-frame camera or one with an APS-C sensor.

But, of course, images are often cropped to all sorts of different aspect ratios – 1:1, 3:1, 4:3, and 5:4, for example. In the days before digital, these crops would be native to the type of camera and film being used, but with a

Canon DSLR, you can do this in-camera. Go into the menu, select Aspect Ratio, and choose from the list and press SET. The camera will now crop your image to the chosen ratio.

When you look through the viewfinder, however, you will still see the full-sized image, without the crop, so it's no aid to composition. But if you switch to Live View then you will see your chosen ratio, with the area around the selected crop blacked out.

Generally, though, it's best to stick to the default 3:2 aspect ratio for most of what you do and, if you choose to, crop later in post-production.



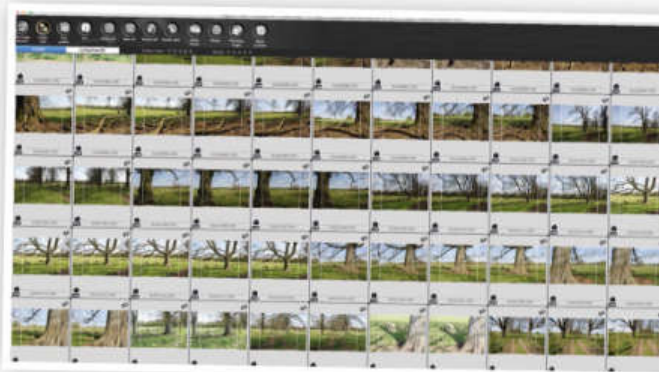
## Aspect ratio and Raw

Un-crop your image with DPP software

**IF YOU ARE** shooting in JPEG quality mode then the camera will crop the file to the selected ratio, and there is no getting back to the default 3:2 aspect ratio if you later change your mind on the crop.

However, if you shoot Raw and process it in Canon's own Digital Photo Professional software, when you open the Raw file thumbnail view

you'll see the normal 3:2 file with the ratio you selected overlaid on it. Open up a Raw file and it will be cropped to the ratio you selected, but you can then override this and return to the default 3:2 ratio by selecting Tools> Start Trimming/Angle Adjustment from the menu bar at the top and, in the window that opens, clicking the Clear button.



**Even if you select a different aspect ratio in-camera, Raw images retain the full 3:2 image; DPP shows the cropped area as an overlay**



## GRID DISPLAY

# Follow the guidelines

Enable grid overlays to help with your compositions

**O**ne other tool at your disposal, that can help with both composition and avoiding wonky horizons, is the **Grid Display** function. It's available in many Canon EOS DSLRs, although with some models there are fewer grid options and it may only be visible when using Live View.

For example, the EOS 700D gives just two Grid Display options – 3x3 and 6x4. Once selected you can't see them through the viewfinder and will have to use Live View in order to be able to view them overlaid on the LCD screen.

However, some more advanced Canon cameras, such as the 70D, 5D Mark III, 5DS, 7D Mark II and 1D X, can be configured so the grid is seen when looking through the viewfinder. To do this, go to 'VF grid display' in the Shooting menu to enable it. Now, whichever grid you choose, it will be shown in the viewfinder or when you select Live View.

Of all the Grid Display options available, the 3x3 view is probably the most useful as it can be used to help with many compositions because it conforms approximately to the rule of thirds. However, all the

grids can be useful for checking that horizons or verticals in building are level, by lining a feature up with one of the gridlines.

There is also a 3x3 grid with added diagonals across the intersecting points for extra compositional assistance, such as following leading lines. But it's important to remember that any Grid Display you choose is just for guidance, and you shouldn't stick rigidly to one specific way of framing shots, or your photos will lack originality. If you activate a grid but feel it is distracting then simply switch it off.



High-end cameras can show the **Grid Display** in the viewfinder



Entry-level models have fewer options, only available in Live View



**3x3 grid**

*This simple overlay will help you create balance by placing your main subject according to the rule of thirds*



**6x4 grid**

*Useful when you have lots of verticals like this, or when shooting building as you can look for unwanted image tilt*



**3x3 + diagonals**

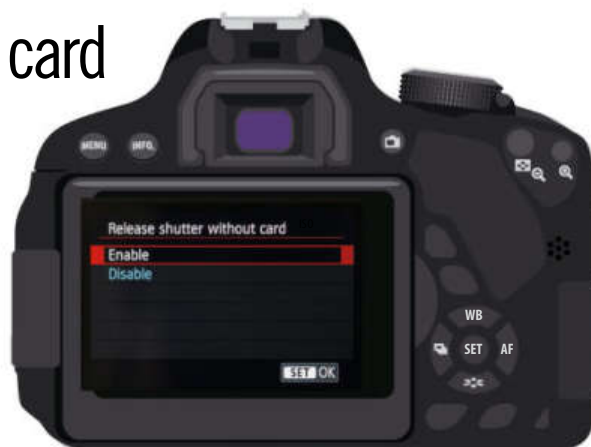
*Added diagonals help you place subjects on intersections, or make use of powerful angles*

## School tip Release shutter without card

Avoid accidentally shooting images without a memory card

**MOST CURRENT** Canon DSLRs will tell you, via the LCD, if you are shooting without a memory card inserted, but it's still possible not to notice this fundamental mistake until it's too late. It's far better to set up your camera so that it refuses to shoot an image unless you have a card installed. Hunt through the red Shooting menu and you will come

across the option 'Release shutter without card'. Select Disable to switch this function off. Once done, the camera won't focus or shoot when you press the shutter button, until you pop a memory card in. However, whenever you put a memory card into the camera, it's always good practice to format it to remove the images from your previous shoot.



## Part 3

# The importance of aperture

Take control of your apertures to reach new heights with your creative photography

**A**perture control is one of the basics of photography. As we touched on in the first Canon School (page 94), the aperture is simply the hole that light passes through in order to capture an image on the camera's sensor. This hole is actually in the lens, rather than the camera body. A ring of blades in the lens close up to form this hole, and its size is determined by the aperture setting you have dialed in.

When you press the shutter button, you activate a chain of mechanical events inside the lens and camera. Depending on your settings, the blades of your aperture close up to form a specific-sized circular hole, the mirror in your Canon DSLR flips out of the way, the shutter mechanism opens to expose the sensor to light, and the exposure is made.

While this is simplification, the point is that aperture size is controllable by you (within a fixed range), and by determining the size of the aperture you have one of the most useful creative tools at your disposal. Understanding how to control it with your DSLR will see your photography leap forward.

While aperture is only one of the three keys elements of the exposure triangle, it is perhaps the one that has the

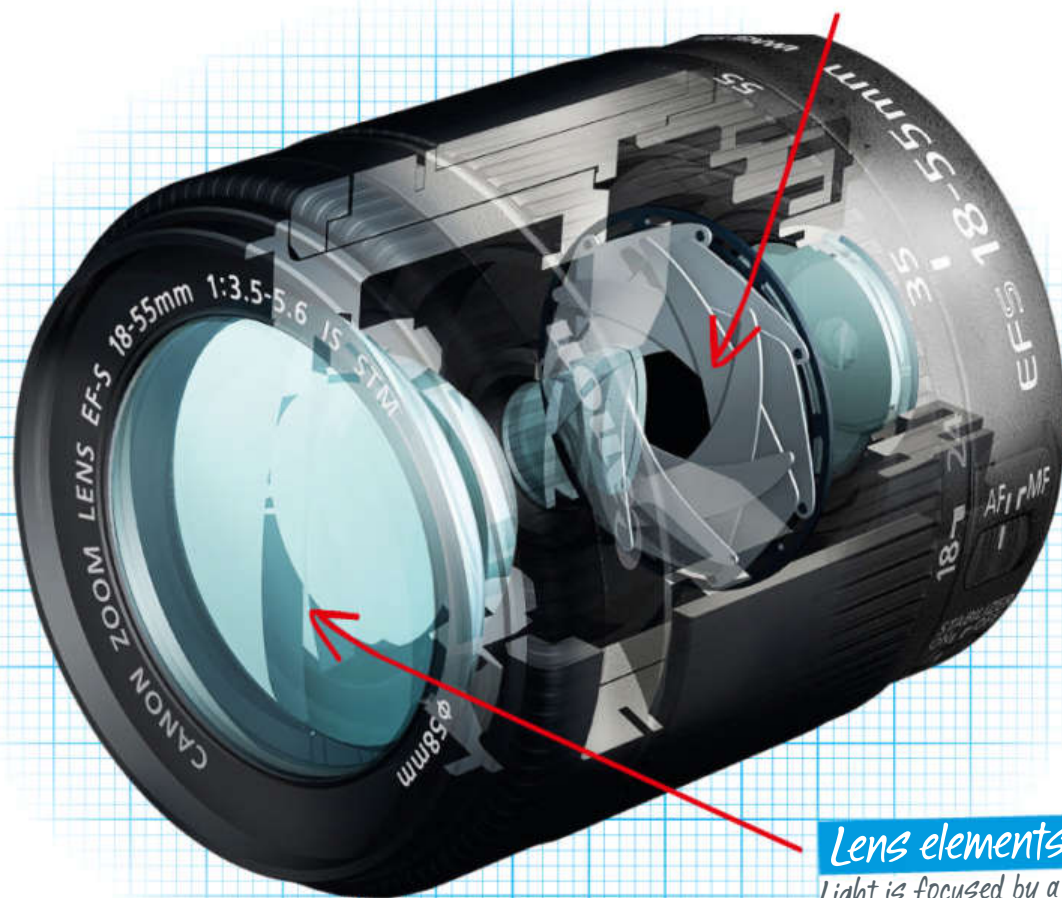
most obvious effect on your final image. This is why my first thought when taking a shot is always: what aperture do I need for the style of image I want? Once I know this, I can then consider the shutter speed and ISO to go alongside

it, to ensure the exposure is how I want it.

Of course, aperture control isn't the only creative element that you need to master, but by understanding the effect it has, you can set out with a specific end result in mind.

## Aperture blades

*The blades of the aperture mechanism form a re-sizable hole that light passes through and into the camera body*



## Lens elements

*Light is focused by a series of lens elements before passing through the aperture blades*



ALL ABOUT **APERTURE**

## APERTURE EXPLAINED

# Learning your f-stops

Knowing your aperture sizes is the key to better results

**T**he size of each of the different aperture 'holes' is measured in f-stops. Newcomers to photography are often confused by the aperture f-stop numbering system, with its odd sequence that initially seems to defy all logic. For starters, a smaller f-stop number, such as f/4, means a bigger hole than a larger f-number, such as f/22. But

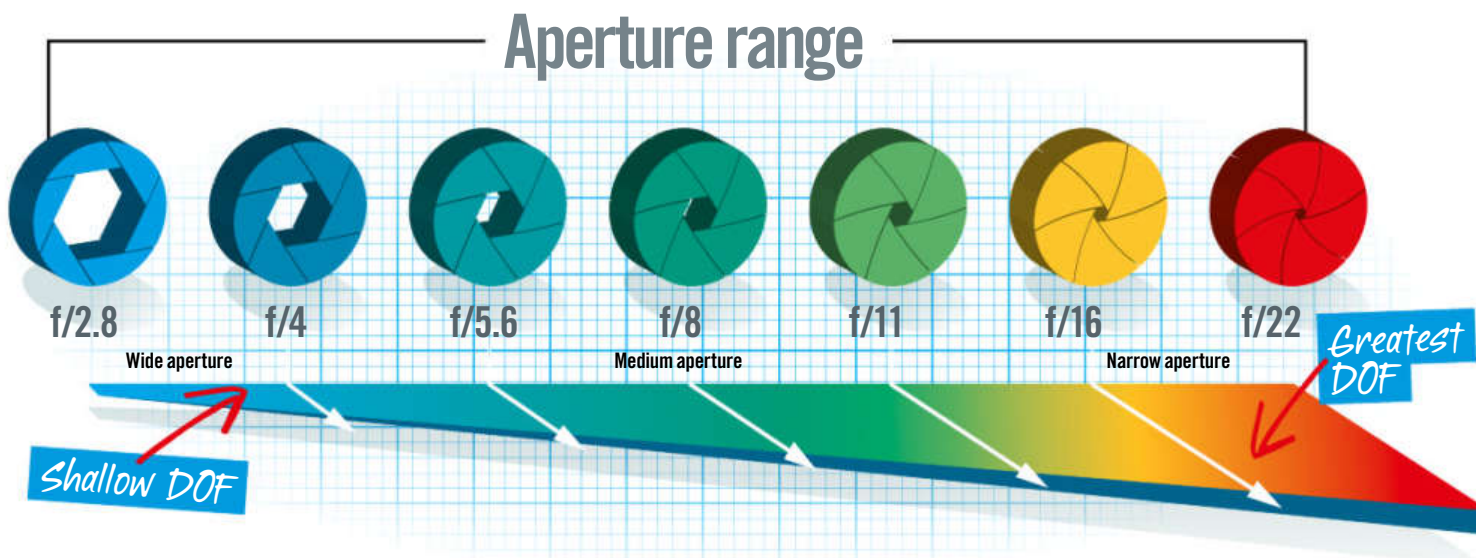
when you realize that this is expressing a fraction (the 'f' stands for focal length), so on a 50mm lens, 50/4 (12.5mm) is a bigger diameter than 50/22 (2.27mm), the 'back-to-front' numbering makes more sense.

A smaller hole lets in less light than a larger hole – this bit, at least, is fairly obvious and is why, when you open up the aperture you need a faster shutter speed to compensate,

and vice versa. Each increase in f-number on the f-stop scale halves the amount of light it lets in. So when you change your selected aperture from f/5.6 to f/8, for example, you are halving the light that is hitting the sensor, so you need to double the amount of time the shutter remains open for.

And as for that illogical sequence? A lens's typical range of full f-stops might go:

f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22. Look at alternate numbers and you'll see that f/4, f/8, f/16 represents a doubling, as does f/2.8, f/5.6, f/11, f/22. The mathematicians among you may recognize the sequence is actually a doubling of the area of its neighbour. Yet ultimately, while f-stops are complex, the range is small, and recalling the sequence soon becomes second nature.



## Wide apertures

**THE WIDEST APERTURES** have f-stops with the smallest numbers. The maximum aperture available depends on the lens you're using. On many zoom lenses the maximum aperture gets smaller as you zoom in to the telephoto end.

## Medium apertures

**THE MIDDLE APERTURES** on your lens tend to give you the best-quality images. However, they might not give you the amount of depth of field you require. Think of it as a balancing act, with some compromise required.

## Narrow apertures

**MOST LENSES HAVE** a minimum aperture of f/22, although some stop at f/16 while others go down to f/32. As aperture gets smaller, depth of field increases. Ultimately, though, the image resolution deteriorates due to diffraction.

## Aperture Priority

Shoot in Av or M modes for total aperture control

**CHOOSING THE** correct aperture for either the lighting you are facing and/or your creative approach is fundamental to good photography. To be precise with this you can either shoot with the camera in full Manual mode or opt for Aperture Priority mode, which is displayed as Av on your Canon DSLR's Exposure Mode

dial – 'A' means 'aperture' and the 'v' simply stands for 'value'.

In Av mode you select the aperture – such as f/5.6 – and the camera works out the corresponding shutter speed at whichever ISO has been set for a good exposure. Of course, like any given exposure it may not be 100% correct, but that's

where checking the histogram and applying exposure compensation comes into play.

I often use Av in preference to full Manual mode because I can control everything I need by keeping an eye on the shutter speed and, if the situation demands it, change it via altering the aperture or the ISO.



# f-stop increments

Choose third or half stop increments for further adjustment

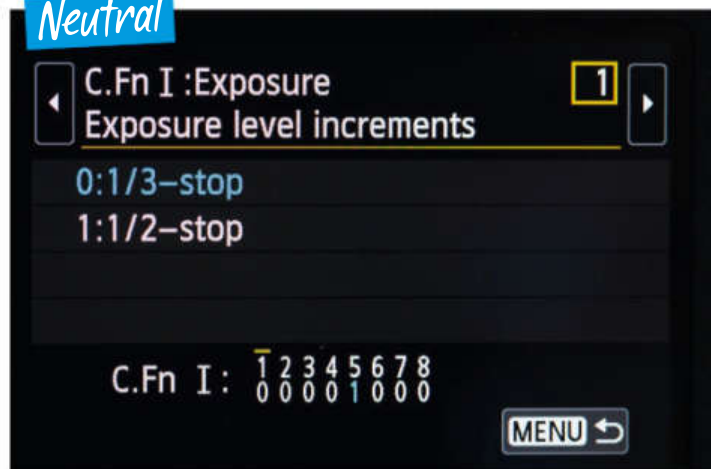
**A**s you can see from the diagram below, in addition to the full range of f-stops, there are also increments in-between, and your Canon DSLR will enable you to set half or one-third f-stop steps (the default) via the menu. For example, while f/5.6 is a full f-stop and the next one in the sequence is f/8, between f/5.6 and f/8 there is f/6.7 if you are changing in half f-stops, or f/6.3 and f/7.1 if you are changing in one-third f-stops.

These exposure level increments apply equally to aperture and shutter speed,

so if you are working in Av mode and dial in exposure compensation, then the shutter speed will change by one-third or half an f-stop. Conversely, if you are shooting in Tv (shutter-priority), then the aperture will change in the given increments as you apply exposure compensation.

As a general rule, I try to set full f-stops for my working apertures – f/4, f/5.6, f/8 and so on – but for exposure compensation reasons, I stick with the default mode of one-third stop increments, as this gives greater control over fine-tuning your exposure.

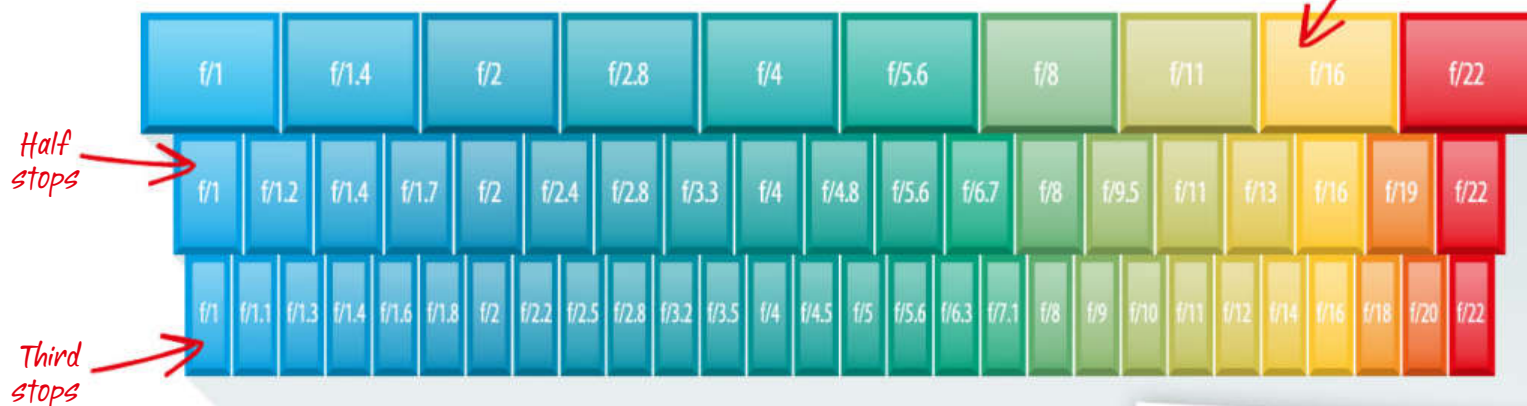
Neutral



Your camera will be set to one-third f-stop increments by default, but you have the option of changing to half-stop increments via the menu

## Full, 1/2, and 1/3 f-Stops

With digital SLRs you will also see full f-stops divided into either thirds or halves. Here's your at-a-glance guide to the numbers...



## The DoF Preview button

Use the depth-of-field preview to check for image sharpness

**WHEN YOU** look at your scene through the viewfinder, what you are viewing is at the widest aperture of your lens. Therefore you don't see what effect aperture actually has on depth of field, so consequently have no idea how much sharpness you have within the image.

To see the effect you'll need to press the DoF Preview button, but

many photographers dismiss this as a gimmick, while some don't even know it exists! To demonstrate the effect, hold down the DoF Preview button and scroll through the apertures and look at the difference changing aperture makes to the sharpness of the background.

Part of the reason the depth of field button gets overlooked is that

the viewfinder can become so dark at narrower apertures that you can't even see the image, let alone the effect on sharpness. However, if you use DoF preview in Live View (with Exposure Simulation enabled), the image doesn't darken, so you get a good idea of the aperture you should be picking for the look you want.



You can only use DoF preview in Aperture Priority, Shutter Priority, Manual and Program modes, as it's only in these modes that you have influence over the aperture selected.



## SHARPNESS CONTROL

# Understanding depth of field

Control front-to-back sharpness in your image with aperture adjustments

**O**ther than letting more or less light enter the camera as part of the exposure triangle, your chosen aperture has a profound effect on the look of your photograph as it affects the through-the-image sharpness, or depth of field.

Essentially you can only focus on a given point within a scene, but the choice of aperture determines how much of the image is in 'acceptably sharp' focus both in front of and behind the point

of focus (actually, it's not just the aperture that decides this – sensor size, distance to subject and focal length are also influences – but for simplicity's sake it is aperture, and specifically your choice of f-stop, that has one of the greatest impacts on your shot).

For example, creative shallow focus is a very popular way to push the viewer's attention to the desired point within the scene. Take a look at the sequence of still-life images below. Each was taken using an 85mm lens and the point at

which the camera has been focused is the second seed head from the right.

At the narrowest aperture of f/16 there is a lot of sharpness throughout the frame but, as the aperture opens, the depth of field is incrementally reduced until, at f/2.8, very little is in sharp focus, except part of the poppy seed head at the point of focus.

Changing aperture has a significant effect on shutter speed because, at each different f-stop, there is correspondingly one stop less

of light. At f/2.8 when the lens aperture is wide open, the shutter speed is 1/50 sec, whereas at f/16, the shutter speed drops to 1 sec, making it impossible to handhold the camera and take a sharp shot, however much depth of field f/16 might provide. In this situation it wouldn't be depth of field that was responsible for a blurred shot but camera movement. This is why we used a tripod and a cable release to fire the shutter, so the camera was rock-steady during every exposure.



**f/16**

At the narrowest aperture, acceptable sharpness extends to the window and the foreground labels are readable



**f/11**

At f/11 the difference isn't that obvious, but the labels in front of the seed heads are slightly more blurred



**f/8**

While there is plenty of sharpness, there is much greater diffusion in front and behind the point of focus



**f/5.6**

The background is now quite diffused and the smaller text on the labels in front has become impossible to read



**f/4**

Sharpness is very limited and the viewer's attention is very much on the seed heads, where I've focused



**f/2.8**

Only the seed head second-from-right is acceptably sharp, so depth of field is limited to a tiny plane

# Lens choice

Know how focal length affects visible sharpness

**W**e can't discuss depth of field without bringing lens choice into it. If you shoot with a wide-angle lens at a 20mm focal length and wide f/4 aperture, it appears that there is much greater depth of field in the resulting image than if you take a telephoto shot at 200mm, again with f/4 as your selected aperture.

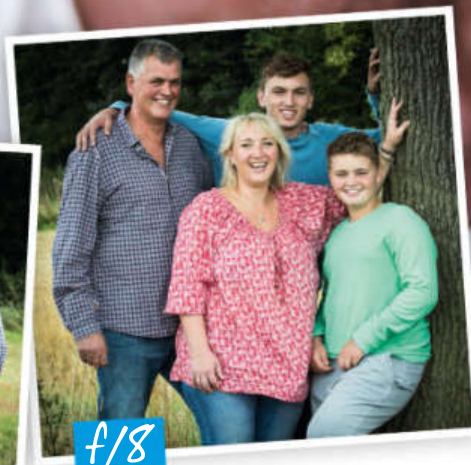
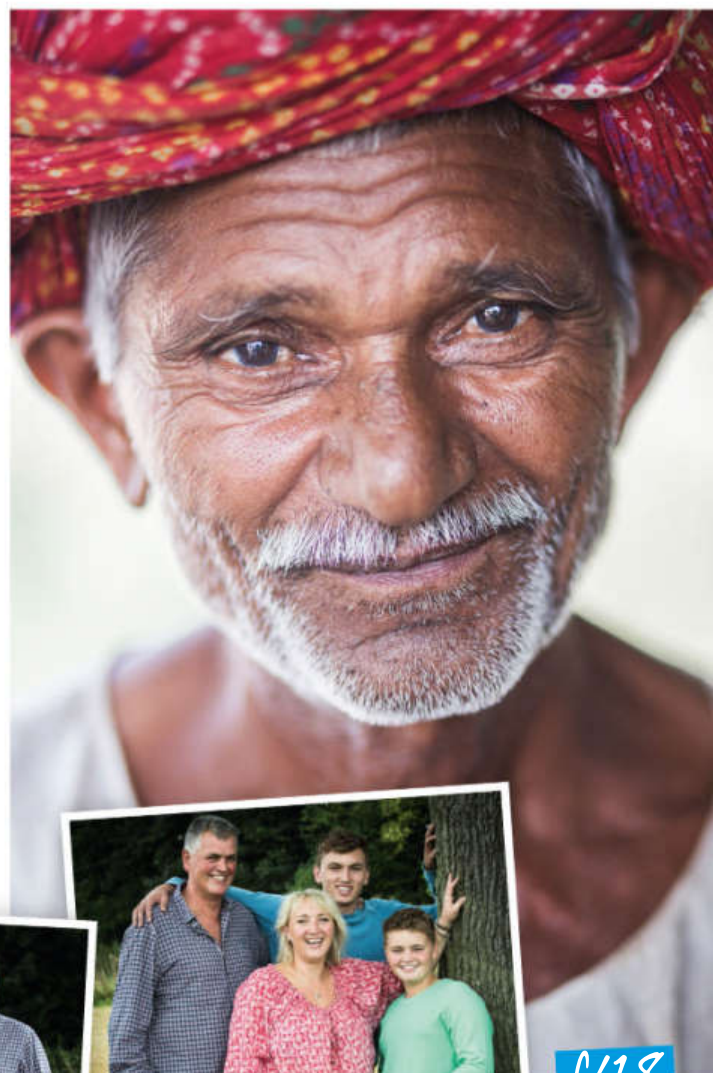
But in fact, if your subject remains at the same size in the frame – and you simply take the shot from further back – then both 20mm and 200mm focal lengths will give the same depth of field at f/4; it's your distance from the subject that counts.

Nevertheless, as you're unlikely to take close-ups with a wide-angle lens, to all intents and purposes a change of focal length makes a big visual difference to depth of field, and shooting with a telephoto lens at a wide aperture results in a very shallow area of sharpness.

One obvious area that this restricted depth of field comes into play is portraiture. This head-and-shoulders

portrait was taken with an 85mm lens at its widest f/1.8 aperture, giving a tiny amount of sharpness; precise focusing was essential, but used effectively it really can push attention onto the eyes.

This is fine for a single person, but for a group shot things become trickier as such a wide aperture will not give you enough depth of field to get everyone's face sharp. In the first group shot, also taken at a focal length of 85mm, a middle aperture of f/5.6 is necessary to get all the family members in focus. In the second shot, however, where there is a greater depth between their positions, a further change of aperture to f/8 was required to keep everyone acceptably sharp.



## Minimum and maximum apertures

Not all lenses have the same apertures, and the faster you go the more you'll pay

**THE APERTURE** quoted in a lens's name refers to its maximum aperture – that's the widest it will open. For example, the Canon EF 16-35mm f/2.8L USM has a maximum aperture of f/2.8 throughout its zoom range. However, a lens such as the Canon EF 24-105mm f/3.5-5.6 IS STM notes two apertures – this is because it has a 'floating' maximum aperture that varies according to its focal length, from f/3.5 at the wide-angle end to f/5.6 at the telephoto end.

What's less obvious is a lens's minimum aperture. This is typically f/22 but can be more or less – macro lenses can reach f/32 or more, while some wide-angle lenses stop at f/16.

Maximum aperture is the most important factor and lenses with very wide apertures are often called 'fast' lenses as the greater amount of light they let in enables faster shutter speeds to be used; they also enhance autofocus speed and accuracy as AF is actuated with aperture wide open.

But fast lenses can be eye-wateringly expensive – an additional f-stop of aperture can nearly double the price of a lens, as illustrated by Canon's 70-200mm f/4 or f/2.8 variants.

Whether this expense is justified is a personal choice. For newcomer or enthusiast photographers, I'd suggest that very expensive fast lenses aren't necessary, but are something you might want to move towards in the future, as they can give you a creative edge.



The EF 16-35mm f/2.8L can open up to f/2.8 through its focal range



ALL ABOUT **APERTURE**

## PRECISE FOCUS

# Aperture and focus

Precise focusing backs up aperture selection

**W**e'll explore focusing in more depth in the future, but it is critical to the success of your image.

I occasionally use hyperfocal distance (a precise calculation based on aperture and focal length to work out where you should focus) for landscape images, but usually simply focus roughly a third into the scene (as depth of field extends one-third in front and two-thirds behind the point of focus), for good front-to-back sharpness through the image, without having to work out precise distances.

In most other situations I'll focus on the point I want to be

critically sharp; in wildlife or portraits, this will be the eyes of the subject. If the lens is focused on the eyes of an animal at  $f/5.6$  then the most important part of the image will be sharp, as long as shutter speed is fast enough to avoid camera shake or subject movement.

Take the two images here. The first was shot with a wide-angle 17mm focal length focused a third into the scene (where the reeds are) with an aperture of  $f/16$ . The result is more than enough depth of field for critical sharpness, from the foreground grasses to the ruined house.



*A wide-angle lens and  $f/16$  aperture gives sharpness from front to back*



*A telephoto lens and  $f/5.6$  limits sharpness and blurs a distracting background*

The tiger image was taken with a telephoto lens at 300mm. The main concern here is to select an aperture that will give enough sharpness on the head of the animal but not so much that a potentially distracting forest background is going to over-dominate the shot. Focusing – with a single AF point – has to be right between the eyes, and  $f/5.6$  was selected to provide the balance between subject

sharpness and background diffusion. There is no room for focusing error or those eyes would not be sharp and the image would be deleted!

## Depth of field in macro

Getting close to your subject reduces depth of field

**THERE IS** another factor that influences depth of field; how close you are to your subject. And nowhere is this more obvious than in macro photography, where you shoot from extremely close up, thus capturing very small objects at life size.

While the principles of aperture remain the same with macro, the actual through-the-image-sharpness is greatly reduced. This makes macro photography an extremely precise

operation where pinpoint focusing and careful use of aperture have to combine for a successful image.

Look at these two example shots. At  $f/2.8$  only the number 15 is in sharp focus. Stopped down to  $f/16$  more of the tape measure becomes readable but, as you can see, we are only talking about a distance of about a centimetre in sharp focus. For a round-up of macro lenses, see the Super Test on page 198.



**The depth-of-field difference between an aperture of  $f/2.8$  and  $f/16$  is measured in millimetres with a macro lens, but it makes a big difference!**

## School tip Screen brightness

Turn up or dim down your LCD for better previewing

**CHANGING THE** brightness of your camera's LCD screen is not something you should need to do often, but sometimes brightening or dimming the screen may help you preview an image better. By default, your Canon DSLR will set a middle level of brightness, but turning it up or down by an increment may help you get a quicker gauge of your

image's composition, depending on the ambient lighting conditions and your eyesight. In bright light, an LCD shield or loupe can really help you see the screen. However, never use the LCD as a 100% accurate gauge of exposure; use the histogram for this and make ensure your Highlight Alert warning is switched on, too, for added information.



# The need for shutter speed

Get to grips with the basics of shutter speed for capturing anything that moves!

**T**here are times when your choice of shutter speed can make or break your shot, so it's absolutely critical to understand how it works so you don't fall into any of the traps that can ruin your image.

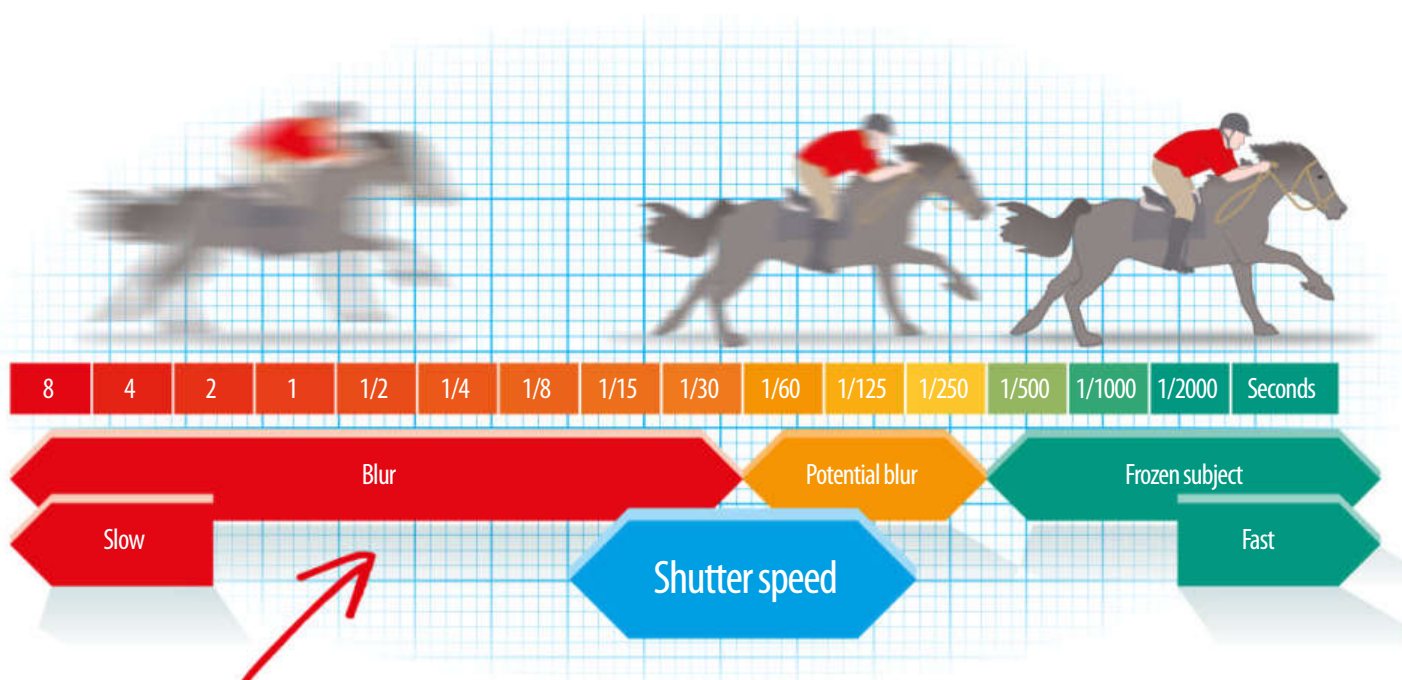
Shutter speed works hand-in-hand with aperture

and ISO, the two other elements in the exposure triangle. Shutter speed is simply the time the camera's sensor is exposed to light. Expose it for too long and you'll end up with an image that is too light (overexposed) but don't expose it for long enough and the image will be too dark (underexposed).

Most Canon DSLRs offer shutter speeds running from 30 seconds on the slow side to 1/4000 sec on the fast side, although enthusiast and pro DSLRs, such as the EOS 70D, 7D Mark II, 5D Mark III and 1D X, offer even faster shutter speeds up to 1/8000 sec. Just as with aperture, these shutter speeds can be changed in

either half- or third-stop increments – with third-stop being the default setting.

But sometimes you may want a shutter speed even slower than the maximum 30 seconds. For this there is a shooting mode called Bulb, which allows you to hold the shutter open indefinitely for super-slow shutter shots.



## Handheld speeds

There's a huge range of available shutter speeds, but for everyday, daylight use, the 1/60-1/500 sec range is commonly used

## Horses for courses

**TYPICAL SHUTTER** speeds that you'll use in normal daylight situations are 1/60 sec, 1/125 sec, 1/250 sec and 1/500 sec. These are expressed in fractions of a second and, as we discovered with aperture increments last issue, they represent a doubling or halving of the other. Take 1/125 sec: this is double (roughly) 1/60 sec or

half 1/250 sec. Imagine you're standing and handholding your DSLR, about to photograph a horse that is galloping in front of you. The horse's speed will be, approximately, 30 miles per hour, so anything below 1/250 sec risks some blur in your subject. Of course, the slower you go, the more blurred the horse will be, not only from its movement but the possibility of camera shake, too. The faster you go, the greater your chance of freezing it.



## ALL ABOUT SHUTTER SPEED

## SHUTTER PRIORITY MODE

## What's on the Tv?

What to know when using Shutter Priority mode

**W**hen it comes to shooting a subject where shutter speed is critical, it makes a lot of sense to use Shutter Priority (Tv) mode.

Imagine you want to photograph a fast-moving subject, such as motorbike. You turn the Main dial to the right to increase shutter speed and keep going until the shutter speed hits its fastest point. You take your shots but when you review them every single one is too dark. Why?

This is where Shutter Priority mode can catch you out, if you are not careful. While it allowed you to select a very fast shutter speed, it had no aperture it could match it with for a correct exposure, and the result was an underexposed shot. Of course, the camera did warn you – the maximum aperture display was flashing in the viewfinder – but it didn't actually prevent you from taking the shot.

Had you heeded the warning you could either have dropped the shutter speed or increased ISO until the maximum aperture figure stopped

flashing. However, if you ignored the warning then your shot would inevitably have been underexposed.

It's for this reason I prefer to use Av (Aperture Priority) mode, even for action. I set the aperture I want, based on how much depth-of-field I think the image needs, and then check the shutter speed. If it's too slow for the subject, I have the choice of either opening the aperture up more (if I can) or increasing ISO. Usually I'll increase ISO; for me, this makes more sense as I can make a creative decision on aperture first, and then alter the settings to get the shutter speed I need.

However, if you want to work in Shutter Priority mode and set a specific shutter speed, make sure the maximum aperture displayed in the viewfinder isn't flashing on and off. If it is, take the shutter speed back a stop or two, or increase ISO. There are two other things you can do to help in this situation, depending on the Canon model you own. We explore these below...

## Av mode

Aperture priority is labelled Av on the Mode dial. While it directly sets the aperture, it indirectly affects the shutter speed, too

## Tv mode

Shutter Priority mode is marked as Tv on the Mode dial – it stands for Time value and gives you complete control over shutter speed



## Safety Shift and Auto ISO settings

Avoid accidental exposure errors to achieve correct exposures

**I**f your camera has a Safety Shift option then using it is one way of avoiding setting the wrong exposure in Shutter Priority (Tv) mode. Not all

Canons boast this function, but most mid-range, high-end enthusiast and pro models do.

Essentially, Safety Shift overrides your exposure if you exceed the camera's limits in shutter speed or aperture. For example, if you are shooting in Tv and set a shutter speed

faster or slower than the correct exposure can cope with, when you take the shot the camera will automatically change the shutter speed to give you a correct exposure.

You can also set ISO Safety Shift so that, if you try to set a shutter speed that's too high for the maximum aperture, then the camera will automatically increase ISO sensitivity to balance the exposure. However it can only work within the limits of ISO at

either end of the sensitivity scale.

If your camera doesn't have Safety Shift then you can set Auto ISO, which ensures that, should you exceed the exposure limits of shutter speed/aperture, the camera will set an ISO to bring the exposure triangle together for a correct exposure.

However, Safety Shift and Auto ISO come with a warning: while they may stop you from



accidentally setting values that don't deliver a balanced exposure, you are also losing some control because the shutter speed, ISO or aperture the camera selects may not be what you want for your image.

# Fast freeze the action

Choosing the right shutter speed for your subject

**I**t's really important to remember that shutter speed choice isn't just down to what you can get away with shooting handheld without causing camera shake. Your subject's movement is a big factor in the decision-making.

Take these two images of an osprey catching a trout. For both shots, the camera was on a tripod, so camera shake was eliminated. In the first shot, as the osprey flies down to snatch its breakfast from the lake, the light is poor. Even at ISO1600 and the widest available f/4 aperture, the fastest shutter speed possible was 1/125 sec. I knew this wouldn't be anywhere near enough to freeze the action. But with the camera and lens on the tripod, I opted to shoot it as a creative

movement image. The osprey's head is the sharpest – as it's moving the least. The rest of its body is blurred – particularly the wings that are beating hard to get lift off. The water spray also shows a lot of movement.

Contrast this with the second shot, taken 15 minutes later. The sun has come up and, consequently, the exposure has too. Still with ISO1600 and an aperture of f/4, the shutter speed has risen by two extra stops to 1/500 sec. While 1/500 sec isn't enough to freeze all the movement, the osprey's head, body, legs and the trout it's holding are sharp, as well as a lot of the droplets of water spray. The fast-beating wings are still blurred, and it would need closer to 1/2000 sec to freeze the motion in them.



## Super-slow shutter speeds in Bulb mode

Lock the shutter open for as long as you want for long-exposure photography

**IF YOU** want to shoot a long exposure but you don't know how long, working in Bulb mode is the answer. On many mid-range and pro Canon DSLRs, Bulb is marked on the

Mode dial with the letter B. On other models you'll find Bulb mode by selecting M (Manual) on the Mode dial and turning the Main dial to the left so the shutter speed gets slower.

Beyond the slowest fixed shutter speed of 30 seconds you'll find Bulb.

With Bulb, the shutter remains open for as long as the shutter button is depressed; as soon as it is released the shutter closes. So, for any exposure that is longer than 30 seconds, such as a firework image, traffic trails, star trails, or even a daylight landscape taken with a 10-stop ND filter, then use Bulb.

You can use Bulb for shorter exposures, too. For example, I use it when light painting; it may be that the exposure will turn out to be less than 30 seconds, but if I am working in Bulb mode then I don't feel like I am rushing against the clock.

In Bulb mode you set the aperture manually – f/8 is usually a good starting point – then hold the shutter open. Use a cable release, not the shutter button itself, to avoid joggling the camera during the exposure.



**On some EOS cameras, Bulb has its own setting on the Mode dial**



**Bulb is the mode to select whenever your exposure time is likely to be longer than 30 seconds – but it can be useful in other situations, too**

Bulb mode is much simpler than it sounds, but the small matter of knowing how long to hold the shutter open for puts people off using it. If you were shooting a landscape with a 10-stop ND filter, then the exposure chart supplied with the filter, or a downloadable smartphone app, will give you an idea. Otherwise, it's a bit of trial and error. But with instant review and histograms on your LCD, it's not too hard to get it right.



## PANNING

# Follow the action

Add a whole new dimension to your action images

**W**hen shooting fast-moving subjects, a fast shutter speed is required to minimize blur, but this can result in a static-looking shot.

One way around this is to use a slower shutter speed and 'pan' to follow the movement of the subject so that it remains as sharp as possible while the background is blurred by the movement of the camera.

The most obvious use of panning is for subjects that move quickly across your frame, such as a bike, car, or, in our case, kart. Good panning is a combination of the right shutter speed, accurate focusing and smooth action on the photographer's part.

For our karting shot, we set a shutter speed of 1/125 sec in Tv mode, resulting in an f/11 aperture. With AI Focus set, focus was locked onto the subject well in advance. The kart was tracked, with the upper body swivelling around, to constantly follow its left-to-right trajectory.

When the kart reached a position slightly to the left of centre, the shutter button was fired and the panning movement of the camera maintained throughout the

exposure. The speed of panning is directly related to the speed of the subject; imagine a fixed invisible line between camera and kart that you need to keep straight throughout the process.

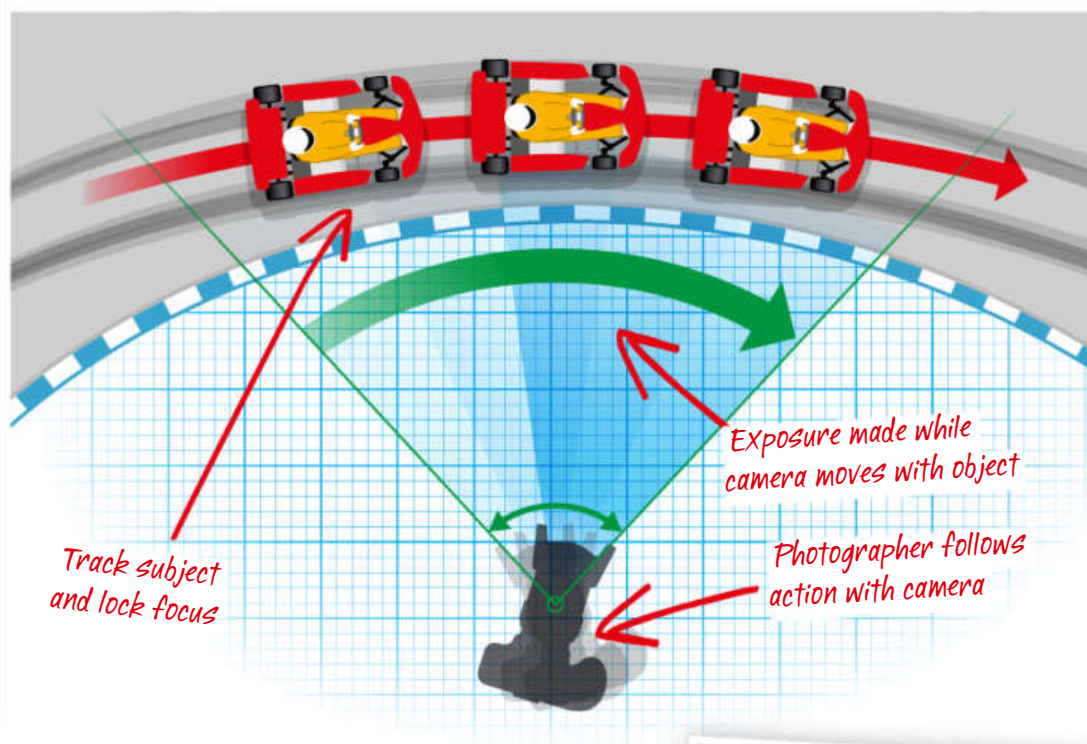
The panning movement has blurred the background, while most of the main subject is sharp – aside from motion blur in the wheels. This all helps to portray a sense of speed, as

well as helping to separate the main subject from the background.

Of course, you can go slower with shutter speed and experiment as much as you like. The slower you go, the harder it is to maintain critical sharpness in the main subject, and your image may take on a more impressionistic look.



*The secret of panning is to follow the subject before you squeeze the shutter button; done well it gives a satisfying impression of speed*



## Get creative with vertical panning

Move the camera up and down for abstract motion-blur images

**YOU CAN** use a similar panning technique with a static subject, like trees, and a slow shutter speed to create a more abstract image. Unlike panning with an active subject, you only have one movement to consider, and that's the movement of your camera. For this reason, you don't need to focus in AI Servo mode and can switch to One Shot or focus manually. I actually find it best to use

One Shot to focus on the nearest tree and then switch to manual so the focus is locked off.

With focus locked, select a slow shutter speed, such as 1/30 sec or 1/15 sec, and tilt the camera up or down during the exposure. Just as when you pan with an active subject moving across you, your camera movement needs to be smooth and you must be moving before and after

you actually fire the shutter button. It's best to get yourself in a rhythmic up and down motion (a bit like a nodding dog) before you squeeze the shutter button. Whether you shoot on the upward or downward motion is up to you. Downward tends to be best if you want to avoid the sky and include more of the ground by timing your shot carefully.



Just as with any creative photography, some experimentation is needed to find the perfect combination of the shutter speed and camera movement, so keep reviewing your shots via the LCD.

# All in the frame

Creating cool in-camera action sequences

**W**ith some EOS DSLRs (7D Mk II, 5D Mk III, 5DS/R and 1D X)

**you can shoot in-camera multiple-exposure images to take a sequence of a subject moving through the frame.** However, if the subject is moving at considerable speed and your framing is tight, you may not be able to capture the complete movement. To give yourself the best chance, make sure your Drive mode is set to High-speed Continuous, so that when you squeeze the shutter release, the camera continues to fire for the number of frames you have specified (up to nine).

You must also remember that, if you are shooting a moving subject, you still need to set a fast shutter speed to

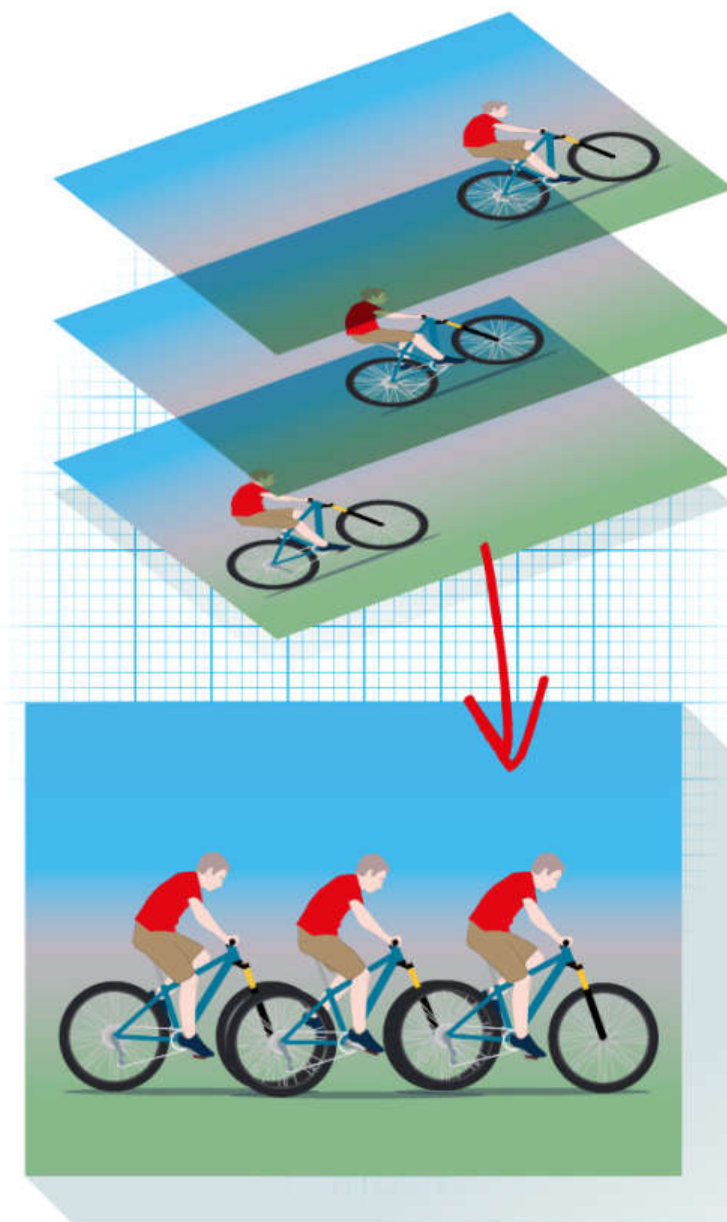
freeze it and, if you don't want the background to show movement too, then you need to remain as still as possible when shooting. Better still, fix your camera on a tripod. For our shot of the boy on the bike, the camera was on a tripod and pre-focused on the exact line he would take through the frame before being switched to manual focus. Then it was simply a case of timing the shots, as he cycled through at speed, so the sequence of three images were well spread through the frame for good composition.

Your camera will not save each of the frames separately – you only get the actual combined image – but if you are shooting Raw then the file can be processed as normal. If you shoot JPEG it will apply your chosen picture style.

Shooting this way is fun but takes a bit of getting used to. The toughest element is getting the timing right so the subject isn't overlapping too much so it's best to start with a slower subject to try out the technique before switching to something faster when you've got the hang of it.



**Multiple Exposure is only available on newer, higher-end EOS cameras**



*Handheld*



**Taken handheld, this multiple-exposure shot freezes the cyclist as he passes through the frame, but the blur of the background spoils the shot**

*Tripod*



**With the camera mounted on a tripod, the background remains static, resulting in a far more effective multiple-exposure image**



## IMAGE STABILIZATION

# Keep it steady for sharp shots

How lenses with built-in stabilization can make a vital difference

**W**hen it comes to getting a sharp shot at slower shutter speeds, Canon's Image Stabilization system (or third-party lens makers' equivalents) is a huge help.

IS detects camera shake and compensates for it. When you press the shutter button, tiny gyroscopes inside the lens sense any shake and pass this on to a microcomputer that moves a special group of lens elements to correct for it.

What goes on under the hood is of less importance to us as photographers, but what's vital is that IS can help you gain up to four stops – so if you shoot at 1/30 sec with IS engaged, you are shooting at the equivalent of 1/500 sec.

A couple of words of warning – IS isn't foolproof and can't perform miracles. It won't guarantee you sharp, handheld shots at very slow speeds, such as 1/8 sec. Success will still depend on your technique and the focal length you are using. It has no impact on subject movement either – so if your shutter speed is too slow for the subject, your shot still won't be sharp!

The longer the focal length you use, the more your shot is susceptible to camera shake

too, so you have to compensate by keeping shutter speeds higher. An oft-quoted rule of thumb is to use a shutter speed that, at a bare minimum, is roughly equal to the focal length of the lens.

You will also often hear advice that says that IS should be switched off when the camera is on a tripod. For very

long exposures, particularly with older lenses, this is good advice, but many newer lenses will sense tripod use and automatically disable IS. If you are shooting with a long lens on a tripod and moving the lens to track a subject, then keep IS on as it will definitely help.

Many telephoto lenses have two Stabilizer modes. Keep the

lens in Mode 1 if you are using the camera normally but, if you are panning, switch to Mode 2; the lens will then detect the direction of movement and disable IS accordingly. Some high-end lenses also have a third IS mode. In IS Mode 3 the IS system only becomes active when the shutter button is fully depressed.



**Modes 1 and 2**

Mode 1 Image Stabilization is for handheld photography, while Mode 2 is used for panning



**Mode 3**

Mode 3 only actuates IS when the shutter is fully pressed, so the image in the viewfinder moves more naturally

## School tip Mirror Lockup

Stop avoidable vibration spoiling a long exposure

**ALTHOUGH NEGLIGIBLE** there is the potential that vibration caused by the internal mirror moving up just before an exposure is made can cause loss of critical sharpness; this is most evident in long-exposure landscapes or macro photography.

The answer is to lock the mirror up before the image is taken. When you enable the Mirror Lockup function,

you have to press the shutter release twice; once to flip the mirror out of the way, and again to take the shot (you'll need to use a remote release to avoid joggling the camera, or the 2-sec Self-timer function). The delay before the image is taken will allow the vibrations to settle. Alternatively, if you shoot in Live View, the mirror is already flipped out of the way.



# Understanding ISO

Changing your ISO setting helps achieve the appropriate exposure

**Shutter speed and aperture are the glamorous two within the exposure triangle, while ISO isn't really seen as something to get too excited about.**

ISO is just there, doing its job, as opposed to being outwardly creative. To some extent this is true but it's a bit unfair on ISO because the ability to change the sensitivity of the sensor from shot to shot is a huge benefit, from both practical and creative perspectives.

In the old days we couldn't change ISO without changing the entire roll of film. A film's sensitivity to light was set by the International Organization for Standardization (from which 'ISO' was coined), and we were stuck with it from the first shot to the last. The

flexibility of ISO on digital cameras revolutionized the way we take photos.

ISO has a fixed scale that we need to understand and this scale runs from low to high sensitivity, with each full increment representing one stop of light. So, for example, if we changed the camera's sensitivity from ISO100 to 200, we would be doubling its sensitivity, while cranking it up to 1600 would be increasing it by four stops. Why is this important? Well if you were standing holding your camera and about to take a photo when a big black cloud came over, you could simply press the ISO button on your camera's body to increase its

sensitivity, allowing you to maintain a shutter speed that is fast enough to avoid camera shake or subject movement messing up your picture.



## Turn down the noise

High ISO increases the risk of noise

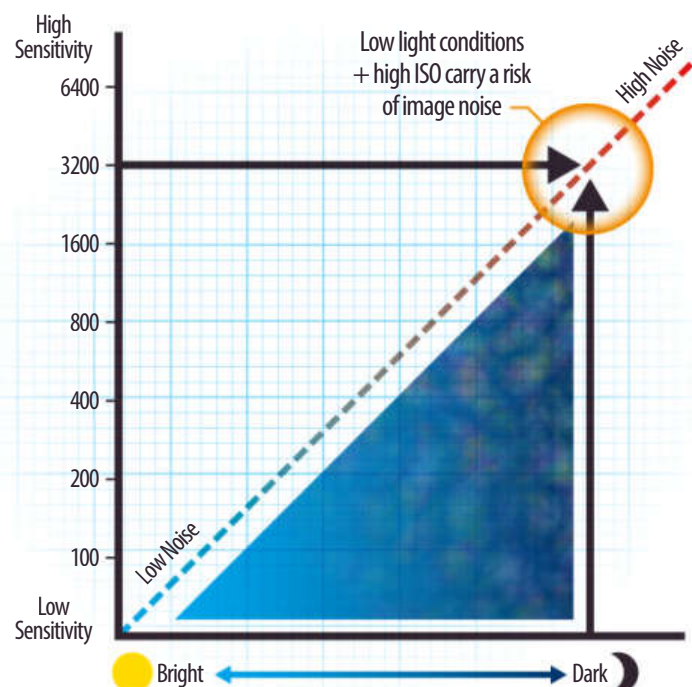
**WHILE INCREASING** the sensitivity of your camera to light can be important, when you do there is a price to pay. The more sensitive the camera becomes, the greater the risk there is to image quality. At lower ISOs colour accuracy is better, the image is cleaner and detail is more refined. This is because increased sensitivity is achieved by amplifying the output of the sensor. In a bright situation, less amplification is required, but in gloomy conditions more is needed to boost the signal and this, in turn, results in image deterioration, commonly referred to as noise.

You will recognize it as either speckled 'grain' (luma noise) or small coloured blotches (chroma noise),

noticeable when you zoom in to look at your image very closely. How your Canon camera deals with this unwanted noise depends on a number of factors – which we'll look at over the next few pages.

However, it's important to remember that Canon has put in a lot of time and effort into reducing how much noise occurs when shooting at high ISOs, and recent cameras are incredibly good at producing quality images at these sensitivities. Software, such as Lightroom, is also very good at reducing noise in post-production.

The upshot is, it's better to put up with a little image noise due to increased ISO than camera shake due to a slow shutter speed.





## ISO SENSITIVITY

# Don't be so sensitive

Why you shouldn't be afraid of increasing ISO

**N**obody wants a decrease in image quality, but sometimes the only option is to push ISO higher in order to achieve the correct combination of shutter speed and aperture for the shot you want.

Over the years there has been an innate fear of shooting at higher ISOs borne from the fact that early digital cameras weren't very good at handling noise at high ISOs and that software, like Photoshop, suddenly gave us the ability to zoom in to stare at every speck and dot we could find. It has made us paranoid about image

noise and obsessive about its eradication or avoidance.

Ultimately, the point at which noise becomes 'unacceptable' is a personal choice and not one that should be based only on staring at a photograph on your computer screen. Try taking a series of test shots of something with different colours and a mix of highlights and shadows, running right through the ISO range. You need to make sure that aperture and lighting remains consistent throughout the test. Assess where you start to see noise come into the equation. Typically this will be around ISO800 or 1600.



Noise you can see zooming in on screen may go unnoticed in print

Make a number of prints of the high ISO frames and you will probably be surprised how little of the noise that you can see on the computer at 100% is obvious on the prints.

It's also worth pointing out that a picture with some noise is better than no picture at all.



## Auto ISO settings

Put a limit on the camera's auto choice

**O**nce you have a good sense of what you think is acceptable or unacceptable in terms of noise, you can use this knowledge to set some parameters when you're using Auto ISO. Don't use

Auto ISO as a default setting because you're handing too much control to the camera. However, there is a case for Auto ISO in certain situations.

For example, where the light is constantly changing and you don't have the time to keep readjusting ISO because you are too busy shooting. This has happened to me at an equine sporting event where the sun was in and out, frequently changing from gloomy to bright, like a light switch being flicked on and off. To ensure the ISO didn't go above what I felt was acceptable on my camera, I set a minimum and maximum ISO to be used in

Auto. In my case this was 100 minimum and 1600 maximum.

On some older Canon DSLRs you can only set a maximum ISO limit but, as it is the maximum where you'll run into potential noise issues, this isn't really a problem. When shooting in Auto ISO, the camera tells you which ISO it is choosing in the bottom-right-hand corner of the viewfinder, so you can keep an eye on what it's setting.



Auto ISO is handy when faced with variable lighting



# How high can you go?

Compare ISO from old and new cameras side by side

**T**o judge how far ISO performance has come over recent years I took a series of shots of the same subject at different ISOs with a Canon EOS 700D, 5D, 5D Mark III and a 1D X. This was a 'real life' photography test, rather than a strictly controlled laboratory one, but I made sure all influences were as consistent as possible.

## ISO100

**THE LOWEST** native ISO on the EOS 700D, 5D and 5D Mark III and 1D X is 100. There is no discernible noise at these low settings on any of the images and, as expected, every camera did an excellent job. Note that while some cameras enable you to select an even lower ISO50, this won't give you less noise than ISO100 – and has its own issues of compromised quality (see right).

## ISO1600

**ALL MODELS** did a reasonable job at ISO1600 but when zooming in the 5D and the 700D started to show their failings – with some discernible noise, particularly in the shadow areas and a lack of sharpness affecting image quality. The more modern 5D Mark III and 1D X, as expected, performed much better, with little or no sign of noise, even when zoomed in at 200%.

## Highest ISO setting

**THE FINAL** shot was taken at each model's highest native ISO setting (except the 5D, where we needed to use the H setting for ISO3200). The 5D does a reasonable job, but it's two stops behind the 700D's ISO12,800, which showed considerable noise. The 5D Mark III's performance at ISO25,600 is considerably cleaner and sharper. The 1D X performance at ISO51,200 is more impressive still.

### 1D X



### ISO100



### ISO1600



### ISO51,200



### 5D Mk III



### ISO100



### ISO1600



### ISO25,600



### 5D



### ISO100



### ISO1600



### ISO3200



### 700D



### ISO100



### ISO1600



### ISO12,800





## ISO EXPANSION

# Push the envelope

Pushing to the outer levels of ISO performance

**C**anon EOS DSLRs also allow you to expand the ISO range. Not only can you expand upwards but you can sometimes expand downwards to an even slower ISO. The default ISO range of your camera is known as the 'native' range, so anything falling below or above that is referred to as 'expanded'.

Expanding upwards beyond the native settings will also always mean that the resulting images are going to be prone to considerable noise, so quality will be an issue.

Take a look at the two example images taken on the 1D X at H1 (ISO102,400) and

H2 (ISO204,800). Even when expanding ISO to these two stratospheric ISO settings, the result is usable. Of course, there is considerable visible noise and a general loss in overall quality, so it's not really recommended other than as a last resort. But when you consider that H2 is six stops above the highest possible ISO setting on the older 5D then it's easy to see how far ISO performance and opportunity has climbed in recent years.

If your model allows you to go lower than ISO100 – by setting ISO50, you need to be aware that this can affect the dynamic range of the highlights by one stop.

1D X - ISO102,400



1D X - ISO204,800



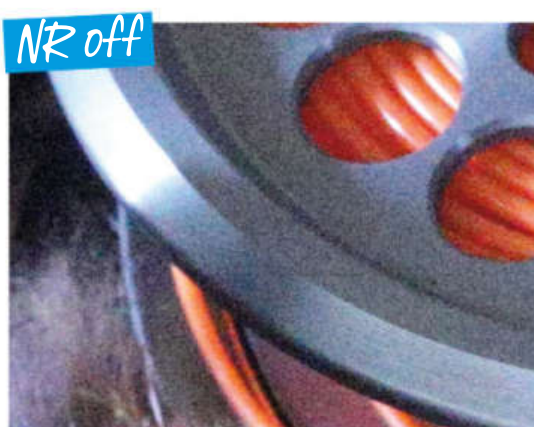
## In-camera noise reduction

Control high ISO noise with your DSLR's settings

**MOST CANON** DSLRs have a setting for High ISO Noise Reduction (NR) hidden within the menu. Some older models only have an on/off option, but in newer cameras you'll find there are four settings – Off, Low, Standard and High. So, is there a case for utilizing the other settings, or even switching it off altogether? Well, if you didn't know it was there in the first place then I wouldn't suggest switching it off as it clearly is having no negative effect on your images.

Having experimented a lot with the settings in controlled situations, Standard is certainly the best default mode, and switching it off entirely would be a mistake unless you never shoot above your camera's minimum ISO setting. Even then, the Low setting may be a better option to disabling it. The High setting does have its place when shooting at very high ISOs. Be aware though, there is some loss of detail in return for the reduced noise. As always, it's a question of compromise and while you gain on one hand, you lose slightly on the other.

NR off



NR low



NR standard



NR high





# Bring the noise

Expose to the right at higher ISOs

**I**f you need to shoot at high ISO it's impossible to avoid noise altogether. But you can minimize it. We've already looked at High ISO NR, and this should be switched to at least Standard if you are expecting to push ISO into the higher brackets. But to avoid it further you need to understand where and when it is most obvious.

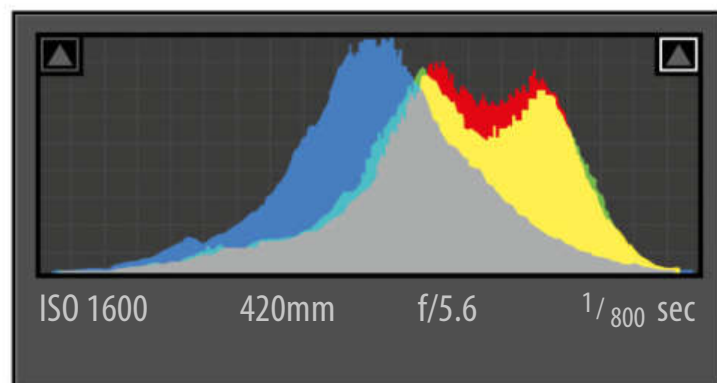
The kind of noise we don't like is most visible in midtone and shadow areas, so an image that is predominantly lighter in tone will show less noise than one that is darker in tone.

When shooting at a high ISO try, wherever possible, to avoid underexposure and push the image's tones to the right of the histogram.

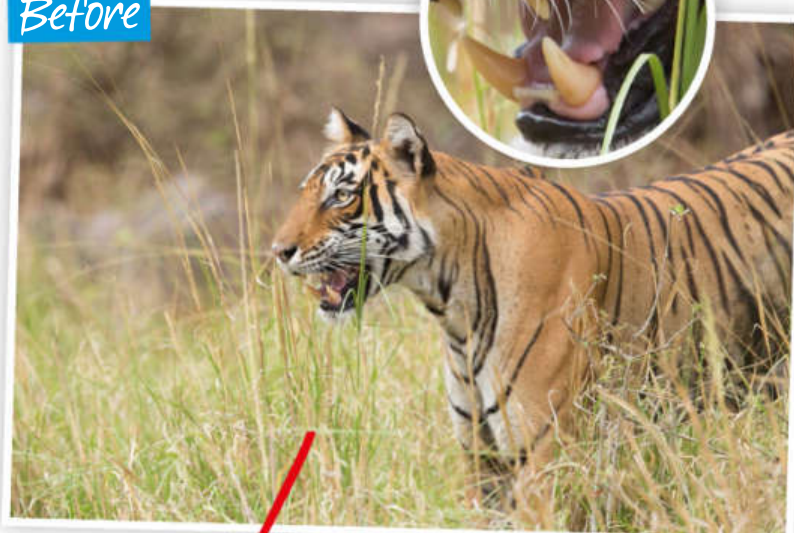
Take this tiger photograph as an example. It was taken early morning on an overcast day, so light conditions were poor. A high shutter speed was needed to avoid camera shake with a handheld 400mm lens, so the ISO was cranked up to 1600. By exposing to the right of the histogram (but without overexposing the highlights in the tiger's fur) noise has been controlled.

## Use the histogram

When shooting at high ISOs, it's important to 'expose to the right', but taking care not to clip the highlights



Before



After



## Choosing your file type

How ISO settings affect your file sizes

**IT'S A LITTLE** known fact that the higher your ISO setting, the larger your file size. Here are our results using a 7D Mk II to shoot the interior of an abbey in low light: at ISO100 Raw image files were 23Mb, at ISO1600 files were 26Mb, at ISO12,800 files were 32Mb, and at ISO51,200 files became much larger at 37Mb.

Shooting in the Raw quality gives you the maximum flexibility, control and quality possible. Your Canon DSLR comes with at least one Raw file option and then several JPEG options, determining both the resolution and amount of compression. For highest quality, particularly if you want to print

your photographs, choose ISO100, and either maximum-resolution Raw or Large, Fine JPEG.

With each different file size, the amount of images you can fit on your memory card and the maximum burst rate will change. At the highest settings you may get the best quality but the payback is fewer images on your card and faster lock-out of the buffer. For example, the EOS 5D Mark III has eight different JPEG sizes and three different Raw sizes. As each file gets smaller, so does its printable size. A Large, Fine 22Mp JPEG file from the 5D Mark III can be printed up to A2, while an S2 JPEG is just 2.5Mp and is really only



suitable for uploading to the web or emailing. You may have good reasons to shoot a smaller file size but remember, if you do, you can't get the bigger, higher quality file size back. Whereas if you shoot at high quality, you can always reduce a file size, save it as a different file and retain the original, too.



## PICTURE STYLES

# Give shots a different look

Change the way your JPEGs are processed to suit your tastes

**I**f you do choose to shoot JPEG, rather than Raw, you can still make the camera process your files how you like them, and you do this by harnessing picture styles. With picture styles you can select a processing style you like, in a similar way to photographers selecting different types of film according to how saturated or natural they wanted the results to be.

Picture styles have been around in Canon DSLRs for a long time but early versions were not adjustable. Now you can have greater control over the end result by setting the amount of Sharpness, Contrast, Saturation and Color Tone you like before you shoot.



## Portrait

Sharpness is slightly less than with Standard, but Color Tone and Saturation are turned down to ensure natural skin tones. A good picture style to pick for a wedding, for example.



## Neutral

As the name suggests, this style provides a 'straight' colour image without any extra Saturation. There is no additional Sharpness, either.



## Standard

This setting is your 'middle of the road' picture style and you'll get saturated colour and sharp shots. Use it as your default if you are a general photographer who shoots JPEG.



## Monochrome

As you'd expect, shoot with this style and you'll get black-and-white JPEGs. Remember, though, you can't turn them back to colour later, unless shooting Raw.



## Faithful

Similar to Neutral, with no Sharpness, Saturation or Contrast added. Best to use when shooting Raw, so your preview doesn't provide a false impression.



## Auto

Your camera selects the style it thinks most appropriate according to the colours and tones in the scene. This is usually the default setting.

## School tip User Def. picture style

Create your own JPEG style for greater image control

**AS WELL** as fine-tuning each picture style you can also create your own with the User Def. options. In the Picture Style menu simply select one of the three User Def. options on the bottom of the list and press the Info button to go into it. You will need to select one of the six preset picture styles as a starting point, and then adjust Sharpness, Contrast, Saturation and Color Tone to your tastes using the individual scales. Once done, the User Def. option you

created will be displayed on the list. It's also good idea to add picture styles to your My Menu listings so you can change them quickly.

### Your own style

*You can easily create your very own picture styles, but need to base it on one of the existing presets*



## Part 6

# In-camera metering

How your DSLR interprets reflected light

**M**etering is the way in which you and your Canon DSLR decide on what the exposure should be for the image you want to capture.

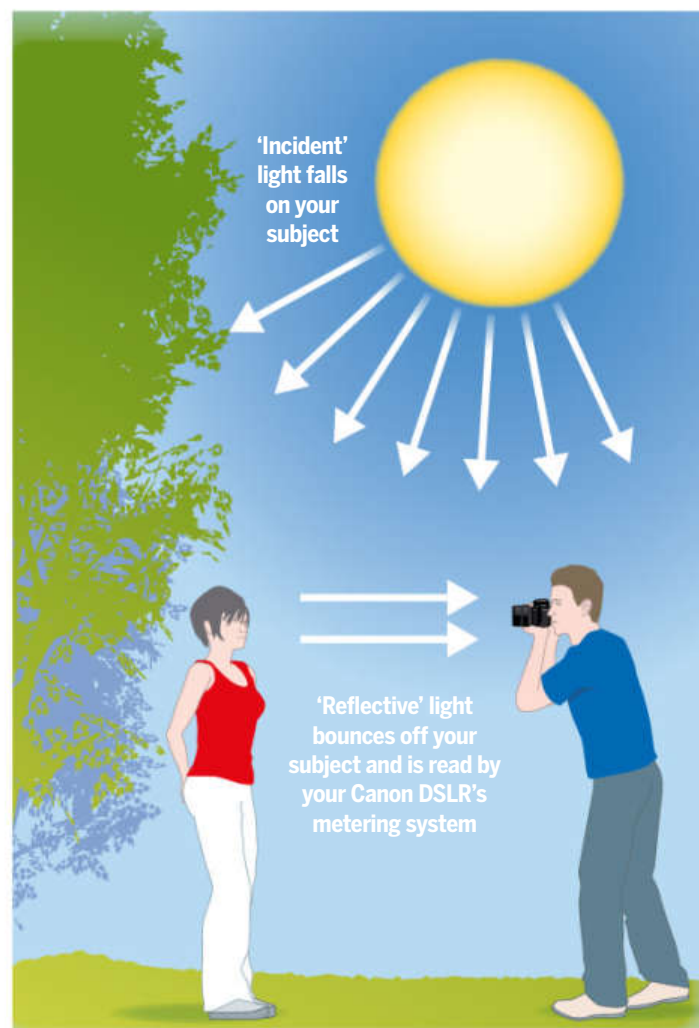
Taking a reading of the light reflecting from a subject enables you and/or the camera to calculate a combination of shutter speed, aperture and ISO that will, hopefully, produce a correctly exposed image.

All Canon DSLRs have a sophisticated metering system, and different metering modes enable the camera to read the light in a way that suits both the subject and the result you want to achieve. But metering can never be 100% accurate, as the quality of the light, and the way it's reflected, differs from scene to scene.

It's the word 'reflective', that's important. Light is said

to be 'incident' light if it's falling directly onto a subject. So your light source – typically the sun, although it could also be flash or studio lighting, is incident light, and this light can be read by an off-camera light meter.

When incident light hits a subject and bounces off it, it becomes reflected light – and it's this light that's used by the camera to calculate exposure. The metering system does this by assuming the world is a midtone grey, or at least that it has the same reflectance of 12-18% grey. Of course this isn't the case, which is why metering doesn't always work perfectly; different objects reflect light in different ways, and this is when your camera can give you an incorrect exposure, underexposing or overexposing an image or parts of an image.



## Why different scenes can confuse the meter

**THESE TWO** images have been converted to greyscale to give you an idea of what the camera's meter is reading. There are no large areas of brightness or darkness in the tree image, so a midtone grey metering won't trouble any of the metering modes and will give a fairly accurate exposure. The gondolas image is different. There are large areas of

shade in the foreground, plus a large, bright sky. Not only is this likely to fool the meter; the scene may also fall outside the camera's exposure latitude. For example, a 6D has one of the best exposure latitudes of any DSLR, but it can still only cope with approximately 11 stops of light before either underexposing or overexposing parts of a scene.





## MASTER METERING



# Metering modes

Learn the four different metering modes in most Canon DSLRs

**Y**our Canon camera typically has four metering modes: **Evaluative, Spot, Centre-weighted average and Partial (the 1200D doesn't have Spot mode).** The default metering mode is Evaluative, and this 'catch-all'

mode is used when you take a picture in any of your camera's auto shooting modes. It takes a series of light readings from different points within the frame and averages them out.

To show you how the four modes work here are a series of portraits, all taken with the

model standing in the shade. Each image was taken at the same focal length, at f/2.8.

Each metering situation is different and therefore it's impossible to say which mode is best, but as you can see from these examples there's little to choose between Partial and

Centre-weighted average for this scene, although none of the modes has completely let the side down. Evaluative has done a pretty good job too, which supports the notion that when you want to hedge your metering bets it's a sensible option to choose.

## Evaluative



Evaluative does a good job, although it's biased towards the zone where the AF point is, as the meter assumes this is the most important part of the scene. It has come up with a 'best of all worlds' exposure: the model's face is only slightly underexposed, and the bright foliage is toned down.

## Partial



As the meter reading is taken entirely from the face area in this shot, the exposure is very much biased towards the skin – exactly what we'd want in a portrait. However, this also means that the background remains bright, although it's certainly not overexposed in this area.

## Spot



As Spot metering only takes a reading from a tiny area of the face in the middle of the frame it produces an image that's slightly underexposed, with detail lost in the shadows of the hair. But it's not far off, and Spot is a good option if you want to be precise about the area you meter from.

## Centre-weighted average



Centre-weighted average has given us a halfway house between the exposures achieved with Spot and Partial, which isn't surprising when you look at the area it's metered from. The resulting exposure is very good in this case, with a lighter face and some hair detail preserved.

## Meter from an AF point

**Y**ou can link Spot metering to a single or group of moveable AF points if you have Canon's current top of the range pro camera, the 1D X, or any of the earlier 1-series cameras. But while this sounds like a great idea in principle, unless you're careful your exposures can be way off the mark.

Whether you're selecting just one AF point or a group, the metering is still only taken

from a 3% area of the frame, so where you're metering from is critical. If the point you need to focus on is very dark, for example, you could end up with a slower shutter speed than you want, and an overexposed image. Conversely, if the area your AF point hits is very bright, the rest of the image will be too dark. However, this option can prove useful, as



these two images show. The darker image was taken with Evaluative metering, and although the camera has attempted to balance the scene, the tricky backlighting isn't helping. However, with

## Evaluative



## Linked to AF



Spot metering linked to AF, and the AF point positioned on the boy's darker top, the resulting exposure is better balanced, with more detail visible in the subject.

# Exposure compensation

Dial in more or less light to get the perfect exposure

**A**s sophisticated as Canon's metering systems are you'll sometimes need to help the camera get things right, and you can do this by using exposure compensation.

On most entry-level and mid-priced Canon DSLRs, to dial in exposure compensation you press the +/- Av button and then turn the command wheel to the right (plus) or left (minus). However, the high-end enthusiast and pro

Canons don't have a +/- Av button; you simply turn the rear command wheel to dial in exposure compensation. For experienced users this becomes second nature, but if you're a beginner it can take a little getting used to; simply remember that it's 'right for light' and left for dark.

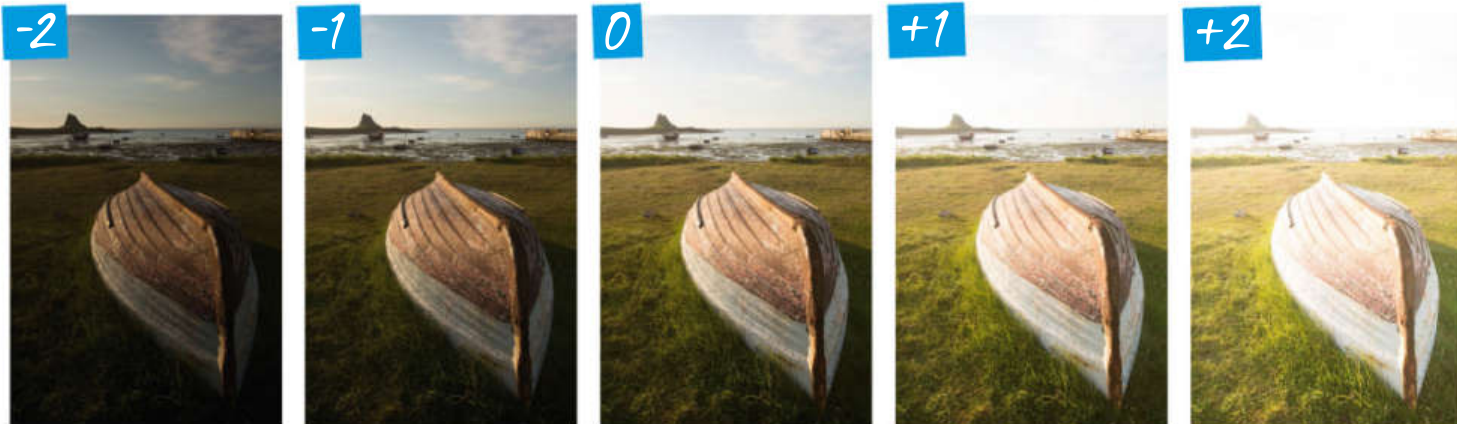
You can only dial in exposure compensation in the semi-auto modes: Shutter Priority, Aperture Priority and Program. You can't use it in any of the fully automatic

shooting modes, or full Manual mode.

Your camera enables you to compensate by up to plus or minus five stops, and the increments in which this can be done varies from model to model. As a rule of thumb, third of a stop increments will give you more precise control over the exposure. You can use exposure compensation with any of the metering modes, although you may find it's more often required with

the more area-specific modes, such as Partial and Spot.

In the examples below, -1 stop of exposure compensation brings out detail in the sky, but underexposes the foreground, while +1 gets the foreground right but blows the sky; the default exposure strikes a reasonable balance, and if you shot Raw you could recover both highlight and shadow detail in post-processing.



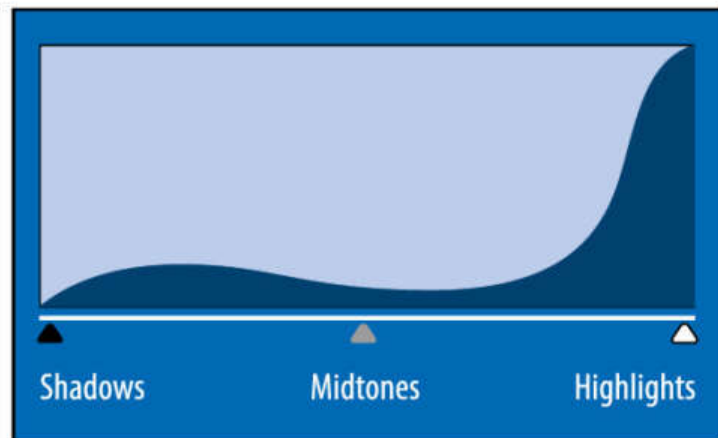
## Assessing the histogram

How to tell when exposure compensation is required

**WE TALKED** about histograms, and how useful they are for exposure assessment, in part 1 of Canon School (page 94), so this is just a reminder that they can be used in conjunction with exposure

compensation. In brief, a histogram is simply a tonal representation of your image, and the graph you see when you press the Info button on your DSLR when reviewing images can give you a precise indication of

whether you're underexposing or overexposing your photo. There's no such thing as a 'perfect' histogram, as each image has a different tonal range (see our high key image and histogram), but it's important to look out for areas that are totally underexposed



The histogram for our high key portrait (left) looks similar to that of an overexposed image, but in this case we're deliberately clipping highlights

or overexposed. These will show as pixels stacked flat against the right (highlights) edge of the histogram. By using exposure compensation you can move the

tonal range towards the left or right as desired. You don't need to look at the histogram of every shot you take but, it can be very handy, especially in tricky lighting.





## BRACKETING &amp; HDR

# Auto bracketing

Shoot a sequence of images at different exposures

**A**s well as dialing in exposure compensation manually, you can also set your Canon DSLR to automatically bracket exposures. When using exposure bracketing you set up the camera so that it will capture (typically) three images: one exposed darker

than metered, one lighter and one at what the camera thinks is the correct exposure.

The bracketing 'spread' can be adjusted, and in most high-end DSLRs you can also choose the sequence in which the exposures are captured; one correct exposure and two 'over' for example. Some pro cameras, such as the

5D Mk III, enable you to adjust the number of images shot.

Why would you want to use bracketing? Well, for a start it's a simple way of hedging your bets, working on the principle that one of the three exposures will be perfect, or close enough that you'll be able to recover sufficient shadow or highlight detail in post-processing. Alternatively, you may want to shoot three images to expose for a greater



dynamic range than can be captured in a single frame, with the intention of merging them to create a high dynamic range image. Either way, it's not really a technique to use for subjects that move, and if you want to merge exposures then your camera must be in the same position on a tripod for all three shots, or the images won't align perfectly.

**Bracketing exposures enables you to create HDR images that capture detail from deep shadows to bright highlights in high-contrast scenes**



## In-camera HDR options

Create a high dynamic range image the easy way

**WHILE YOU** can use exposure bracketing to capture a series of differently exposed images to blend together in post-production, newer EOS DSLRs – such as the 7D Mk II, 5D Mk III, 5DS and 5DS R – enable you to capture and process the files as an HDR image in-camera.

Although it's an automatic mode, you can choose the amount of exposure bracketing applied, and the style of blending that's used. Most of the blending comes strictly from the 'over the top' drawer, so if you want to use in-camera HDR then stick with

Natural as your setting, unless you have a particular liking for the over-processed images created by using Art standard, Art vivid, Art bold or Art embossed.

There's no doubt that in-camera HDR works, and it's a no-fuss way to get that popular HDR look. However, you don't get as much control as you would by shooting a series of frames with different exposures and then blending them with software on your PC. When blending images, the in-camera software relies on each frame being taken from precisely the same point, so it's essential to use a tripod. But you can shoot handheld

with fast shutter speeds, and the camera will attempt to align the three frames. Note that the in-camera HDR images end up cropped so allow for this in your compositions. Plus the HDR image will only be saved as a JPEG, although you can save the three originals Raw files.



In-camera HDR is very effective as long as the camera is locked on a tripod – and provided you stick with the Natural effect



# Lock the exposure

Use the AE lock button to 'save' an exposure

**T**he AE lock function on your Canon camera is a useful way of 'saving' an exposure setting while you recompose a shot, and it's well worth familiarising yourself with this feature.

The AE lock button is on the back of the camera, usually on the upper right-hand side, and it's marked by a \* symbol. It's easily operated with your thumb, and when you press

it the camera will store the metered exposure until you take the next shot; if you want to lock the exposure in for several frames it pays to keep the button pressed, or the exposure may drop out.

Using AE lock you can, for example, point the camera at and meter from a midtone area of a scene (pavement, grass, etc) to give you an average exposure, then lock that exposure in while you reframe and take the shot.



The AE lock button is within easy reach of your thumb

Without AE lock, when you're in Aperture Priority or Shutter Priority modes, once you've recomposed a scene the camera will alter the exposure

according to the change in reflected light; if it happens to meter from a very bright or dark area then the resulting exposure may be way off.

# Go Manual

How to take full control of your exposures

**W**hen you want to take full control over exposure settings, Manual mode is the way to go. In full Manual mode – M on your DSLR's command dial – you set the shutter speed and aperture independently of one another, using the command wheels on the back and top of the camera.

The only 'help' the camera gives you is to indicate when it thinks the exposure is correct, by placing the point on the exposure indicator bar in the centre of the scale. Using full Manual mode is easy as long as you've grasped the relationship between shutter speed, aperture and ISO, and know which is the most important element within the 'triangle' for you to get right.

In other words, if front-to-back sharpness is required for a landscape image, then aperture will be your starting point. Set a narrow aperture, such as f/11 or f/16, and then see what shutter speed you



Manual mode can give you better results in tricky lighting conditions, such as snowy scenes

need to set. Conversely, for an action shot of some sort, shutter speed will be your prime consideration.

Manual isn't necessary for every shooting situation. A lot of the time I'll shoot in Aperture Priority mode, but there are occasions when I'll want the complete control of Manual, such as when taking

landscapes, shooting in a studio environment or for any general shots where the exposure is particularly tricky, such as the above shot of the hare sitting in his snow hole.

Remember, in Manual mode whatever exposure you dial in is fixed, even if you recompose a scene. This isn't the case in either of the

semi-automatic modes, where you need to use the AE lock button (above) if you want to hold an exposure in place when you move the camera.

Of course, just because the indicator is in the centre of the exposure dial it doesn't mean the exposure is correct, so be sure to check exposures, using the histogram as a guide.



## EXPOSURE WARNINGS

# Be alert to overexposure

Use the Highlight alert to keep detail in bright subjects

**T**he Highlight alert is a very useful function for those who are getting to grips with understanding exposure but are making a few mistakes along the way. It was briefly mentioned in part 1 of Canon School, but deserves a longer explanation.

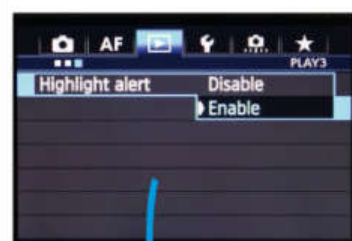
In most of the current EOS DSLRs you can have Highlight alert disabled or enabled, and if you find that you're consistently overexposing images I'd recommend that you enable it immediately.

The LCD screen provides a preview of the image you've just taken, but it's not always easy to see that image, especially in bright conditions. I often resort to finding shade, or even sticking the camera under my shirt to review the image on the screen! Even then the JPEG preview isn't a 100% accurate reflection of the image you've just taken.

This is why, especially in tricky, bright conditions I'll enable the Highlight alert, so that any areas of an image where the highlights have pushed too far to the right will blink black in the LCD screen as another

visual indication of overexposure. If I see the screen blinking like this I'll double check the degree of overexposure by referring to the histogram, then dial in the required amount of negative exposure compensation.

I've found that sometimes, although the Highlight alert is



blinking, the histogram shows that the highlights are within the acceptable range, so don't assume that detail is always totally blowing out – just check to ensure that you're in control of the exposure; remember, sometimes you may be quite happy to blow some highlights as long as the main subject is exposed

correctly. Also bear in mind that if you're shooting Raw and you overexpose an image slightly then you can usually pull the detail back into the image in post-production, as long as it isn't drastically bright in those areas; if you shoot JPEGs there's much less chance of retrieving lost highlight detail.



Preserving the highlights is important in bright and finely detailed subjects such as flowers

## School tip Auto Lighting Optimizer

Use ALO to balance exposures by enhancing shadow detail

When you're shooting JPEGs in harsh lighting it can be useful to enable the Auto Lighting Optimizer. This has been available in all Canon EOS DSLRs since 2008, and is designed to even out exposures so that the overall image is better balanced.

There are three ALO settings, as well as the option to disable the function. These are Standard, Low

and Strong, with Standard being the default mode and certainly the most useful. It works by bringing out the shadow detail, although if you're not careful it can do this at the expense of pushing the highlights too far. Other than in extreme contrast conditions, stick with the Standard setting, and keep a check on highlight detail by looking at the histogram.



# The importance of white balance

Why you shouldn't always rely on Auto WB

**W**hite balance is **easy isn't it?** You just stick it onto Auto WB and let the camera take care of the rest?

Well, you can take the lazy approach, but you will get much better results if you understand a little bit more about colour temperature.

The simple truth is, white balance really is the thing that many photographers choose to ignore for 99.9% of the time; especially if they are shooting Raw because, even if they get it wrong, it's easy to correct in post-production. I confess this was also my attitude for a long time but these days I pay a little more attention to it, and this pays dividends in fewer colour casts and less laborious correcting in software.

## Kelvin scale

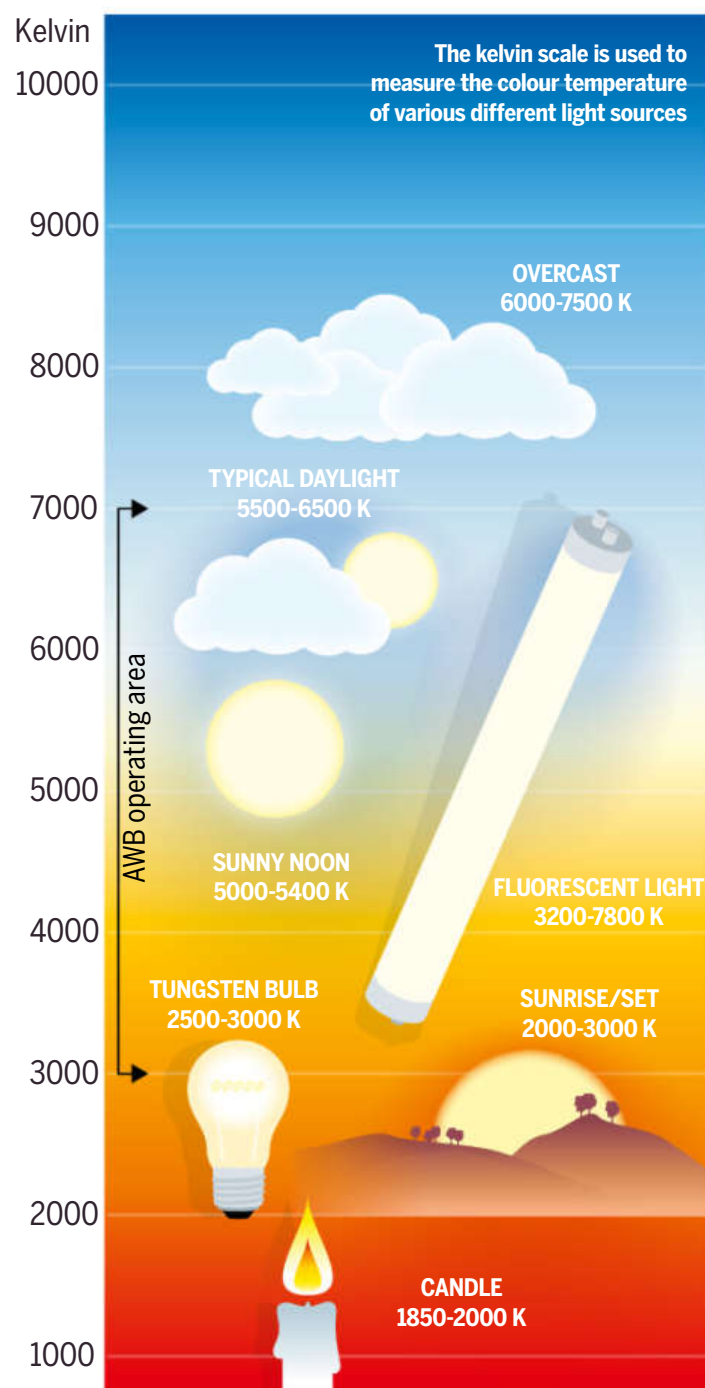
Colour temperature is measured in kelvins, named after William Kelvin, a scientist from the late 1800s who essentially created a scale of temperature that starts at absolute zero – that's -273°C. The reason that this is

relevant to us is the 'temperature' of light changes depending on the source and, if it's that big light source in the sky, called the sun, it changes at different times of the day. So, to shoot a picture where the colours don't look wrong, we need to ensure our white

Your Canon DSLR comes with a whole range of different white balance presets and you can create your own custom ones too, so with all this technology at our fingertips it's only right we work out how and when we should be straying beyond Auto WB.

It's also worth pointing out that post-production WB settings don't necessarily exactly match in-camera ones, unless you are using Canon's own Digital Photo Professional software. If using third-party Raw conversion software, such as Lightroom or Adobe Camera Raw, then it is the 'As Shot' setting that will show how the camera captured the WB, rather than the equivalent slider for Daylight, Shade, Tungsten and so on.

balance is suited to the conditions. You won't notice the more subtle changes in colour temperature because the human eye is amazingly good at adjusting for it. Your camera isn't, though, which is where WB settings or adjustments come into their own.





## WB PRESETS

# White balance settings

What effect do those different presets have?

**T**he effect different white balance settings have on an image largely depends on the temperature of the subject and the colours within it. This series of shots, taken in daylight on an overcast day using a Canon EOS 5D Mk III, will give you an idea of how different WB settings introduce different colour casts or, used in the right

circumstances, neutralize them. Naturally, some of these temperature changes are subtler than others.

In order to manually select a white balance preset, you must be working in the Creative Zone on your EOS camera, so that's P (Program), Av (Aperture-priority), Tv (Shutter-priority) or Manual (M). In all of your camera's automatic settings, the white balance will default to Auto.



## Auto WB

**AWB** 3000-7000 K

As you can see AWB doesn't have a fixed temperature but the camera will estimate the correct temperature within broader parameters. In this case it has chosen 5950 K. Auto white balance works best when the scene isn't dominated by one colour, but for a mixed scene like this it has performed reasonably well. There's nothing wrong with using AWB; just be aware it can get it wrong sometimes.



## Shade WB



7000 K

At this white balance more warmth is added to the image and the whites have a strong yellow hue to them. It doesn't look right with this photo but if you want to give your photographs a distinctly warmer appearance then Shade is the go-to WB. Be warned, though, it can also look unnatural if overused or used in the wrong conditions.



## Flash WB



Automatically set

Naturally you'd normally use Flash white balance when using a flashgun, but set it without and it tends to give a quite a neutral result. Here it has given us 5500 K – only a miniscule amount warmer than Daylight white balance and it is, at least for this scene, a reasonable choice, although Daylight WB has done a better job.



## Cloudy WB



6000 K

At 6000 K, the image has been very slightly warmed up compared to AWB. It's very subtle so you may barely notice it but Cloudy white balance has given us a step up in warmth, adding a slight yellow tone to the image that doesn't work in this instance but could help to make some scenes, such as a sunset or sunrise, look more inviting.



## Fluorescent WB



4000 K

Fluorescent WB is designed to balance artificial fluorescent lighting and so our outdoor shot takes on a distinct blue cast that cools the whole frame down and looks very wrong. While it would help to balance an indoor scene lit by fluorescent bulbs, fluoro lighting has varying temperatures, so it's not 100% successful in neutralizing casts.



## Daylight WB



5200 K

The most obvious WB to set for this image is Daylight, and the result is slightly cooler than AWB. This certainly looks the most natural for this particular shot because the whites are, indeed, whiter! This is the go-to WB when shooting outdoors in average or typical lighting conditions. Indeed, I use this as my default white balance, rather than AWB.



## Tungsten WB



3200 K

This indoor setting further cools down our daylight image with an even more pronounced blue tone. But used indoors when the scene is illuminated by a tungsten lamp it will do a very good job at neutralizing the yellow light that's being emitted. It can have its moments outdoors too – when using it will enhance the mood of an image.



# Setting kelvin manually

For ultimate accuracy set your own temperature

**O**n some EOS cameras you can also dial in your own specific kelvin temperature. This is a feature that is ignored by most photographers but it is an option if you want to be very picky with your white balance. For example, if you know the typical temperature of a scene then you can set that manually in kelvin to try and neutralize any potential colour cast.

For example, a candle typically emits a colour

temperature of 1900 K or thereabouts. The image taken using AWB gives us a strong orangey glow and a temperature of 3200 K. But switching to K on the camera's white balance settings and simply dialing in the lowest manual kelvin setting of 2500 gives us a more neutral result.

You may prefer the warmer glow of the AWB result, but the option to set specific kelvin temperatures, and reduce or remove colour casts, is there should you need it. I find this really useful when using a

Daylight WB



filter like the Lee Big Stopper. This filter tends to add a strong blue cast to an image,

Manual WB: 2500 K



but if I manually set the kelvin to 10,000 when I take the shot, it largely resolves this issue.

## Custom white balance

Go Custom for near-perfect results every time

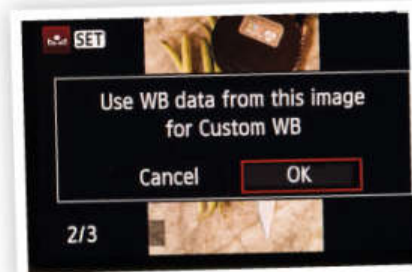
**S**etting a Custom white balance is a bit of a faff and there are many shooting situations where it just isn't practical. However, in some situations, where you have time and lighting isn't likely to change much, then it is worth doing because it gives practically perfect results straight out of the camera.

The camera makes a series of calculations based on the scene and then works out what temperature it needs to shift in order to remove any colour cast. In other words, anything that is supposed to be white will be white and the rest of the colours should be totally natural. Here's how to set a Custom white balance:

**1** Get a piece of white card (you can also use grey) or a purpose made white balance checker. Place this in the middle of your picture so that it fills a reasonable amount of the frame – it *must* fill the centre spot circle you see in the middle of the viewfinder. Now adjust your exposure to the scene and take a photo. At this stage it doesn't matter what WB you have set – you can use anything!

**2** Go into your camera's menu system and find the Custom WB setting (on the 5D Mark III it's in the red Shoot2 menu). Go into it and select the image you've just taken with the white card/WB checker in the frame and press

Set. The camera will ask you to confirm this is the image you want to use so hit OK. Once that's done, all you have to do is select the Custom white balance preset and take your photo – this time without the white card in the shot!





## SHIFT &amp; BRACKET WB

# Shift your white balance

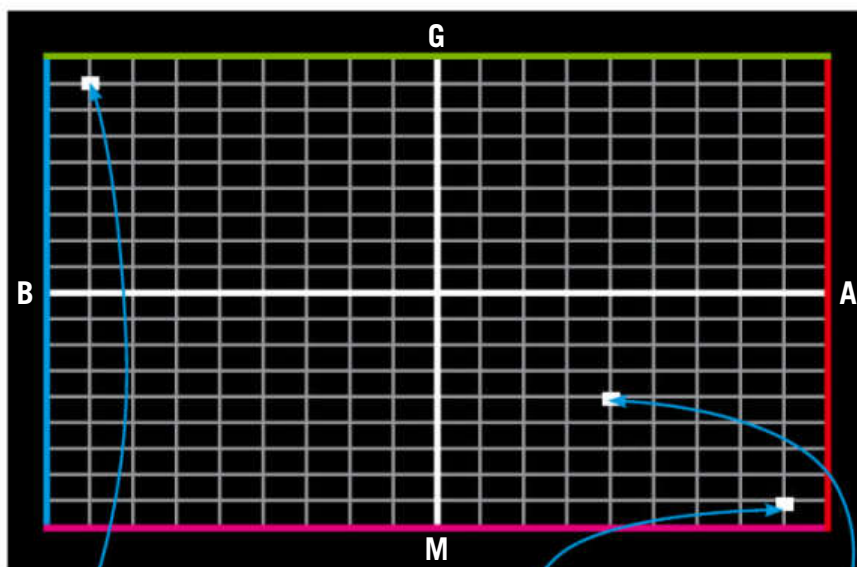
Tweak the temperature to suit the image

All current Canon DSLRs enable you to manipulate the white balance at the taking stage beyond simply dialing in a WB preset – or setting a Custom WB – with the WB Shift/Bkt feature. It allows you to manually move white balance along Blue/Amber and Green/Magenta axis.

White Balance Shift can be confusing and is best used only if you are shooting in a particularly tricky WB situation. For example, if you

find your image is looking too blue, you can Shift the WB in nine increments towards Amber for a warmer image. With some experimentation you should be able to get the exact WB you want.

You can move the white balance point to anywhere within the Blue, Green, Amber and Magenta range – although obviously if you go to the extremes you can expect to end up with similarly extreme results.



**WB shift B9/G9**

An extreme shift to blue/green makes things even worse, and introduces a truly horrible colour cast.



**WB shift A9/M9**

Manually shifting the temperature to the bottom-right has produced an overly warmed up image.



**WB Shift A4/M4**

But a four-step shift to Amber 4/Magenta 4 warms the image up slightly and gives a much better result.

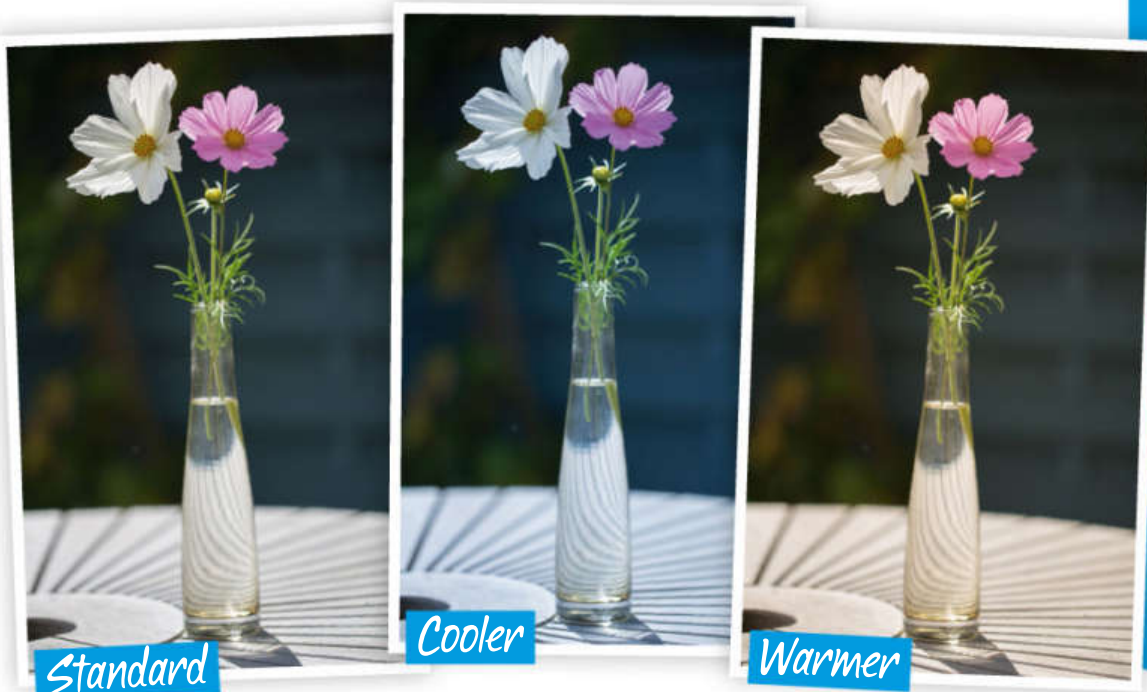
## Bracketed white balance

For tricky light, hedge your white balance bets

This isn't a function I've ever found a huge amount of use for as I shoot Raw all the time, so bracketing a Raw file seems like overkill.

However, if you shoot JPEGs and don't want to be bothered with a Custom WB, then this is one answer to tricky light conditions. The image will bracket in either the Blue/Amber or Magenta/Green directions in three steps, and all three images will be created with a single press of the shutter button.

The first shot is the standard shot at the preset WB you have set. The next shot will be towards Blue or Magenta, and the final one Amber or Green. You can see this in the three example images. The standard shot was taken on Auto WB, but next two images show a distinct cooling or warming of the image.



# Use white balance creatively

Use temperature to enhance mood

**S**o far we've mainly talked about using white balance to get rid of unwanted colour casts that make the image look unnatural. However, there is a creative side to manipulating colour temperature to give your images a new look by deliberately accentuating an 'incorrect' colour tone for added impact.

If you're shooting Raw then you can do this at the post-processing stage, but again, it's worth trying some of these techniques at the taking stage too because they are fun to do and quite satisfying when you get them right.



## ▲ Inject some warmth

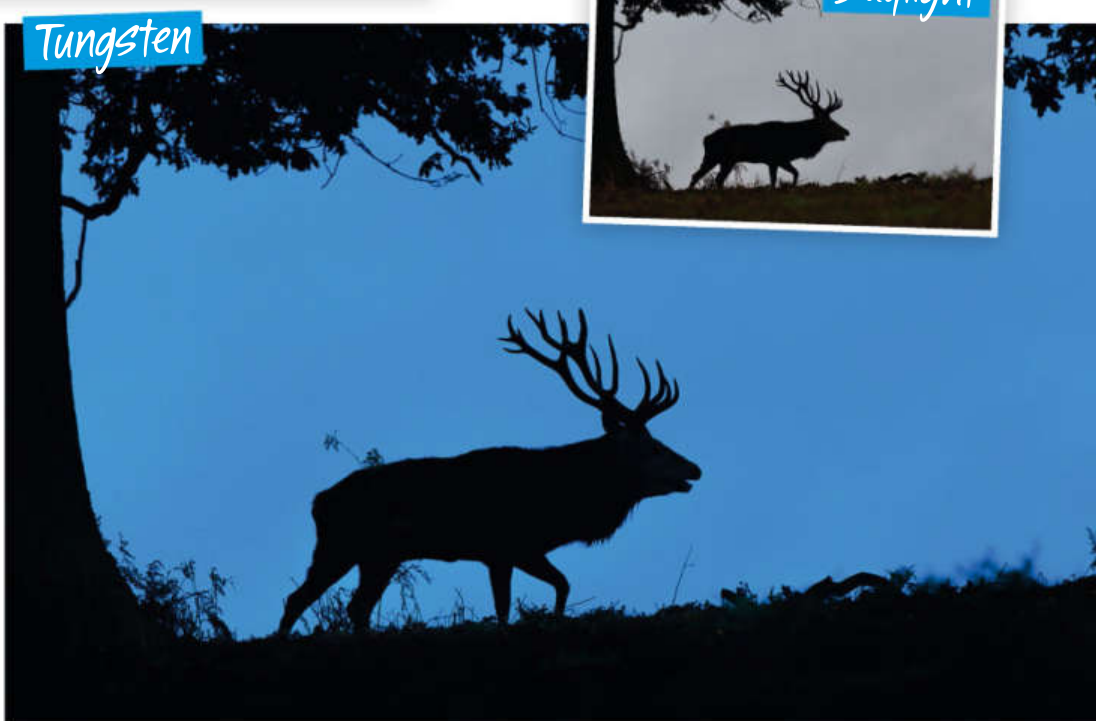
Using Cloudy or Shade WB will warm your image up significantly, with Shade delivering a much stronger orange cast over the image. If you do this in the middle of the day, this cast can look wrong, but try it at either ends of the day and you can certainly breathe extra life into your photos. The first attempt at capturing these swans swimming on the river at first light was taken using Daylight WB. The morning light was surprisingly cool, so a switch to Shade WB really warmed the whole scene up and made it much more inviting.

## ▲ Liven up landscapes

I'd hoped for some interesting colour in the sky when taking this landscape but sadly, as often happens, the faint glow of warmth on the horizon never really developed. Shooting with the white balance set to Daylight produced a really grey image that I felt didn't have any impact. Switching to Fluorescent WB gave a much moodier result. Used sparingly this trick certainly can give a drab photo a lift.

## ► Striking silhouettes

Here's a technique to try if you ever get a chance to silhouette an animal but the conditions are, frankly, a bit dull and lacking in atmosphere. It was shown to me by wildlife pro and Canon Explorer Andy Rouse and can work a treat. Instead of just settling for that rather uninspiring sky, change WB to Tungsten. This temperature change can make a big difference as the cool colour tone and works well on the boring sky, but it only really works when shooting early or late.





## WB IN POST-PRODUCTION

# Fine tuning Raw files in post-production

Raw allows you maximum post-shot flexibility

**W**hile this month's Canon School has highlighted many of the in-camera controls for white balance, there is always the option to fine-tune temperature in post-production, whether you use Canon's Digital Photo Professional software or a third-party one, like Lightroom.

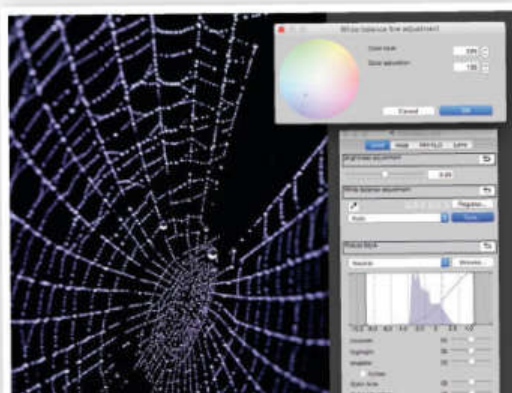
And while I said at the start that using AWB isn't always the best option, there are occasions when you don't have time to keep checking colour temperature and need the camera to do a little bit of the work for you. AWB gives reasonable results under

normal daylight conditions, although I've found that it tends to favour a slightly warmer tone. On the occasions I use it, I usually find myself tweaking an image in post-production to get more of the mood I want, or simply to neutralize that slightly warmer cast AWB tends to deliver.

To take any colour bias out I use the White Balance Dropper, touching it onto anything that looks white within the image. If I can't find a white point within the photo then I manipulate the White Balance Fine Adjustment In Digital Photo Professional, by moving the WB point around in the circle. It's important that you have a calibrated computer screen so that what you see really is what you get.

It's also easy to use the White Balance Fine Adjustment tool to boost a tone, just as I've done here with this spider's web.

Fine-tuning white balance in post-processing can have a dramatic effect



DPP's White Balance Fine Adjustment tool enables you to get perfect whites under tricky conditions

Pushing the temperature towards the cooler tones and slightly desaturating the image at the same time gets a decent result.

Remember, always relying on post-production to fix white balance mistakes caused by

not paying attention at the taking stage isn't the best approach. Try to get WB correct as far as possible in-camera and then tweak or enhance your image for greater impact when using Raw conversion software.

## School tip

### Live View WB simulation

Get an instant assessment of white balance presets

If you want an instant check on the difference one WB setting will make over the next then simply switch your camera to Live View. Just as you get exposure simulation in Live View, WB simulation shows the effect

of the WB presets so you can evaluate the look of different settings before you actually take the shot and thus decide which one is best suited to the scene. Depending on the model of EOS you have, you will either be able

to access white balance in Live View via its dedicated button or, if that doesn't work, press the Quick Control button (Q) and access it from there. Each of the WB presets will be shown on the Live View screen.



When shooting in Live View you can instantly see the effect of different WB presets



# Prokit

Alex Hyde	138
Brett Harkness	140
Oliver Wright	142
Victoria Hillman	144
Andrea Denniss	146
David Clapp	148
Adam Gasson	150



138



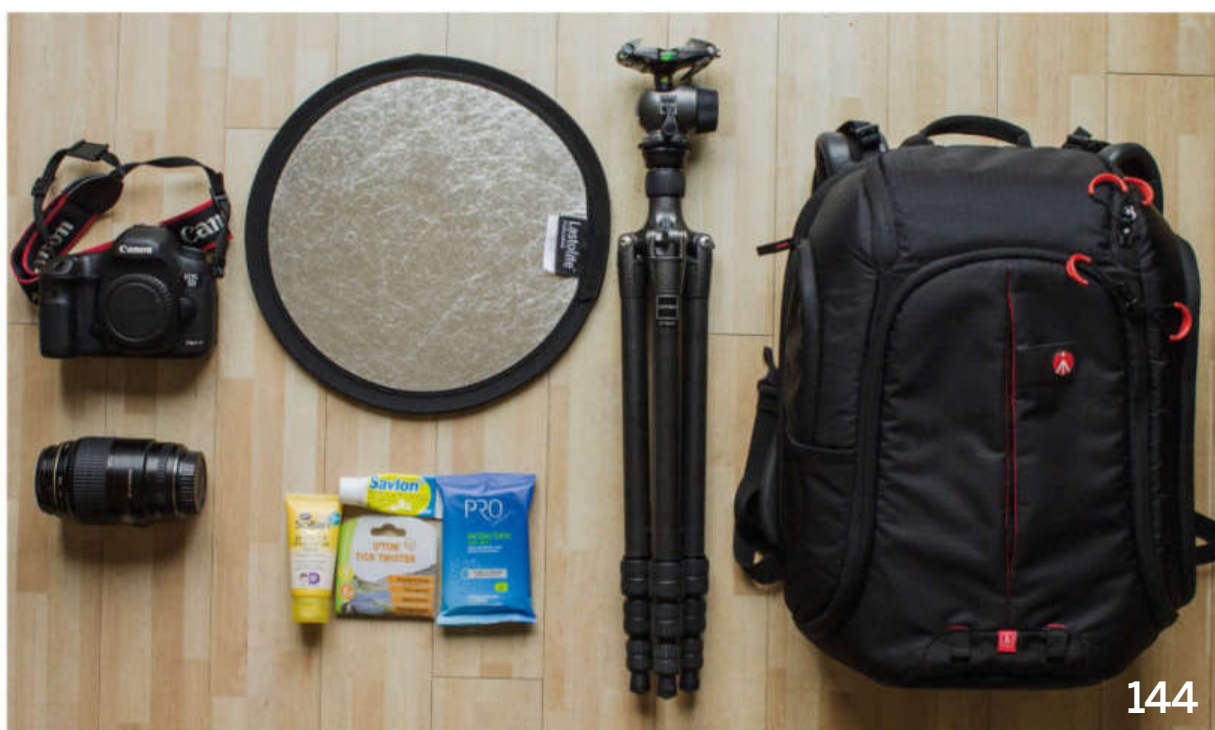




140



142



144



# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

Many of my macro pictures involve moving subjects smaller than a grain of rice

## Alex Hyde

Natural history photographer Alex tries to travel with the bare minimum of gear, but doesn't go anywhere without his tripod, or miniature in-the-field repair kit. . .

**M**any of us suffer from over-filled bags, bursting with gadgets that rarely see the light of day. Over the years I have been trying to pare things down to a core of essential items for my macro wildlife photography.

Some items, such as a small paintbrush for cleaning dirt off subjects like toadstools, take up very little space but can make all the difference to a shot. At the other end of the scale, you certainly notice

when you are carrying a tripod, and although relatively heavy, I almost always bring mine along. When shooting with natural light, shutter speeds can get very long indeed as the limited depth of field at high magnifications means narrow apertures are often required. In such cases, a sturdy tripod setup is essential. Frequently working with subjects close to the ground, I often use a Gitzo carbon fibre Systematic series tripod that has no centre column, allowing me to get down low. I use a large Really

Right Stuff BH-55 LR ball head that is rock solid while making it quick and easy to adjust the camera position. It's such a shame when a potentially breathtaking photo is ruined by a flimsy, wobbly tripod setup, so don't take shortcuts here if you can avoid it.

Equipment has a habit of breaking at the worst possible moment, so I always bring a small roll of electrical tape, some zip ties, a penknife and a set of Allen keys – this little toolkit has saved the day on numerous occasions and lives in the depths of my bag.

### WHAT DO I DO?



### Alex Hyde

[www.alexhyde.co.uk](http://www.alexhyde.co.uk)

**I WORK** as a freelance natural history photographer, based in the Peak District, and also run photography workshops and tours. Whether in the rainforests of Borneo or my back garden, I am usually in search of insects, spiders and other creatures. When composing a scene through my macro lens, I am always struck with a sense of discovery. Many of my pictures involve moving subjects smaller than a grain of rice, requiring specialised macro equipment and a fair measure of patience!



## CANON PROS &amp; THEIR KIT

## IN ALEX'S BAG



### 01 Canon MP-E 65mm

WEB: [canon.co.uk](http://canon.co.uk)  
PRICE: £849/\$1049

**I ALSO** shoot with Canon's 100mm IS Macro lens, which is razor sharp and still gets in very close, but some smaller subjects really benefit from going beyond the 1:1 enlargement ratio of a 'standard' macro lens. The MP-E 65mm f/2.8 can zoom from 1:1 all the way up to 5:1, opening up a new range of subjects. Filling the frame with an insect's head is always exciting! Depth of field is very limited, so precise focusing is required using my focusing rail.

### 02 Canon ST-E3-RT

WEB: [canon.co.uk](http://canon.co.uk)  
PRICE: £239/\$265

**THIS** controls my two off-camera 600EX-RT Speedlites. As a radio trigger it doesn't need a line of sight to fire the flashguns, making it very easy to use. I have found the system to be really reliable and it's very convenient to be able to adjust the power of each Speedlite independently, direct from the ST-E3-RT unit that sits neatly in the camera's hotshoe. Even when using a single flashgun, it's still great not to need a trailing off-camera flash lead that can get in the way.

### 03 Really Right Stuff Macro rail (B150-B)

WEB: [reallyrightstuff.com](http://reallyrightstuff.com)  
PRICE: £309/\$345

**THIS** attaches to the Really Right Stuff ball head on my battered Gitzo tripod. The rail enables me to move the camera backwards or forwards by tiny increments. When using Live View at 10x magnification, the macro rail means I can fine-tune exactly what's in focus. A full rotation of the knob gives 1mm of movement. I also use this to advance the camera forward between frames when focus stacking.

### 04 Mighty Bright LED book light

WEB: [amazon.co.uk](http://amazon.co.uk)  
PRICE: £10/\$10

**DUE** to light loss at high magnifications, things can get pretty dark when using my MP-E 65mm macro lens. I find clipping this little LED light to my setup helps me get the light I need for accurate focusing. This LED isn't being used to light the finished photograph, as I normally use flash when working with the MP-E 65mm, but simply to allow me to see to compose and focus. It's sold as light to clip onto a music stand or a book.

### 05 White tray

**I USE** this white tray for my field studio work. It's made from translucent white plastic so a flash can be placed beneath it to remove any shadows from underneath a subject sitting on the tray, creating a pure white background. A second flash is positioned above the tray to light the subject. I photograph insects with this setup and also aquatic creatures, as the tray can be filled with water. All of this work is done out in the field so the subjects can quickly be returned to their habitats.

### 06 Novoflex Ground spike rod system

WEB: [www.novoflex.com](http://www.novoflex.com)  
PRICE: £40/\$55

**THE** next best thing to a third arm, this modular system from Novoflex allows me to be hands-free with my off-camera flash. The spike can be pushed into the ground and will support a large Speedlite such as the 600EX-RT. The flash is mounted onto the small ball head at the end of the rod, allowing the flash to be articulated at various angles, and additional rod sections can be added if you need more height.

# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

Photo: Eyvind Ness

Canon's 50mm f/1.2L is hard to get sharp, but with an f/2 sweet spot it can't be beaten

## Brett Harkness

Manchester-based social photographer Brett Harkness travels the world in the search for perfect portraits, and tells us which tools he simply can't live without...

**B**eing a social photographer, covering weddings, portraits and editorial work, my kit list can be quite extensive and varied. But for most of my shoots I turn to my beloved Canon EOS-1Ds Mark III.

Yes, I know it's old, but while the saying goes "if it ain't broke, don't fix it" this camera has been through three shutters now, yet still remains my workhorse. Its rugged build quality and the tonal quality it produces

simply cannot be matched by anything launched since.

So what lens do I throw onto this body? Well it's the Canon 50mm f/1.2L. This is my soulmate (along with my wife, of course...). I have used just about nothing else in the past two years. The focal length isn't to everyone's liking but I have become used to it. I use it for weddings, fashion shoots and personal work. It's a hard lens to get sharp, for sure, but with an f/2 sweet spot it can't be beaten.

All this kit has to go somewhere, especially as

I travel a lot. With shoots in Ibiza, Italy, France, Ireland and Canada in a typical year, my kit has to come with me and stay close to hand, and for me there's nothing better on the market than Think Tank bags. The wheeled version saves my back from destruction, and is great as carry-on luggage, as it meets European and USA airline size restrictions. Best of all, this bad boy allows me to keep most of my kit in one place and has enough space for a laptop and headphones in the front pocket. Oh, I do love a good bag!

### WHAT DO I DO?



### Brett Harkness

[www.brettharknessphotography.com](http://www.brettharknessphotography.com)

**WEEKS AFTER** graduating from a photography degree at Nottingham Trent University in 1995, I joined a Caribbean cruise liner as an on-ship photographer for six years. In addition to gaining a grounding in photography, I met my wife Kristie, who now helps run Brett Harkness Photography, near Manchester. Specializing in weddings and editorial work, my artistic and dynamic style takes me on shoots all over the UK and Europe. I also run widely-acclaimed training classes.



## IN BRETT'S BAG



### 01 Lastolite Trigrip Reflector

WEB: [www.lastolite.co.uk](http://www.lastolite.co.uk)  
PRICE: £93/\$99

**A REFLECTOR** is a great piece of kit and one that any social photographer should carry around with them. I use Lastolite's Large 120cm Trigrip; the triangular design makes it easy to manipulate, while the double-sided Sunlite and Soft Silver surfaces give a great reflection, filling in shadows on subjects. It can also be used to lie on top of in puddles, when needs be!

### 02 Elinchrom Ranger RX Speed AS

WEB: [www.elinchrom.com](http://www.elinchrom.com)  
PRICE: £1849/\$2645

**THIS** pack has been everywhere with me! I have yet to change the bulbs on the heads, and kicking out 1100 Ws of power nearly every day of its life, it has served me well. This rugged power pack has a seven-stop range and manages a full recycle in under three seconds. Yes, there are plenty of other packs on the market now, but this still remains my favourite kit.

### 03 Lee Filter Wide Angle Hood & 0.9 ProGlass ND Standard

WEB: [www.leefilters.com](http://www.leefilters.com)  
PRICE: £289/\$450

**THIS** doesn't come out at weddings, but I often use it for portrait and fashion work. Sometimes I want to shoot wide open, giving my images a softer look, but using strobes at high speed isn't always an option. This ND system allows me to stop down the light, enabling me to keep the shutter at a sync speed of 1/250 sec.

### 04 Thermal travel coffee cup

**AS A** social photographer I have a big love for the java! I have tried to cut down on my caffeine intake, but you cannot beat the feeling of getting a shoot in the can and relaxing with a nice cup of fresh Cuban coffee! My trusty insulated mug keeps it piping hot, however far from civilization I may be shooting.

### 05 Pocket Wizard Plus III

WEB: [www.pocketwizard.com](http://www.pocketwizard.com)  
PRICE: £130/\$155

**THERE** are literally dozens of radio flash triggers on the market nowadays, but Pocket Wizards were the first. Being radio, rather than infrared, they have a huge range, don't need to be in line-of-sight of the camera, and work no matter how bright the ambient lighting conditions. These, and the older Plus IIs, have been my workhorses for years now, and the reason is simple – they just work!

### 06 Think Tank Pro Speed Belt

WEB: [www.thinktankphoto.com](http://www.thinktankphoto.com)  
PRICE: £30/\$42

**A KIT** belt isn't for everyone and even I might be getting a 'gunslinger'-style strap soon. But for now, as I need my kit close by at all times, this belt-based system is the one for me. With add-on pouches for my lenses and kit, easy access to everything is the name of the game. Even a bottle of water and a snack is always close to hand!



# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without



www.abisko.net

**Batteries don't last long when it gets colder than -20°C**

## Oliver Wright

Having the right equipment to hand is vital for Oliver, whether he's shooting still-life macro in the studio or crossing the Arctic tundra in search of the Northern Lights

**M**y love for photography covers a large range of subjects.

I photograph a lot of wildlife and macro but I'm equally comfortable with landscapes or in the studio. This means that I have to make decisions about what kit to take when heading out on a shoot. It's straightforward when doing a commercial job but when heading out to do my own photography, it's important for me to think about what I want to get out of that location. For

example, I went to the Yorkshire Dales recently to photograph waterfalls and I was also getting superb views of dippers and grey wagtails.

A lot of my photography also takes place when walking with my dog, so strong walking boots are essential and my Rab Neutrino down jacket packs down to nothing. Camera bags are also very important – especially if I'm carrying my 800mm and 1D X – I need it to be comfortable if I'm walking along the rugged coastline of the Isle of Mull looking for otters, and I also

need to be able to get the camera out of my bag quickly if I have a special encounter.

Last winter I worked in Abisko, 190km north of the Arctic circle. I used thick, wool-lined gloves with mitts over the top, which I could pull off to do anything delicate with the camera. Batteries don't last long when it gets colder than -20°C, so I keep spares in my inside pockets to keep them warm and swap them over when the one in use dies. I found that once a battery has warmed up, it's about 75% charged again.

### WHAT DO I DO?



Mat Richardson Photography

### Oliver Wright

[www.oliverwrightphotography.com](http://www.oliverwrightphotography.com)

**I RUN** macro workshops in the studio and also a variety of landscape workshops. I also do commercial photography, which can cover a variety of subjects, from lightbulbs to kitchens. Last winter I worked in Abisko for Lights Over Lapland as an aurora photography guide and I shall be there this winter too, as it's an amazing place to work.



## IN OLIVER'S BAG



**01**  
**Canon**  
**EF 800mm**  
**f/5.6L IS USM**  
 WEB: [www.canon.co.uk](http://www.canon.co.uk)  
 PRICE: £9900/\$13,000

**I FOUND** in my love of wildlife photography that you need a really long focal length. So when I saw this second-hand Canon EF 800mm for sale, I spent the money I had saved for a new kitchen. This is my go-to lens for wildlife as it just gets you so much closer to your subjects. The lens is very sharp, and with the IS feature I can shoot handheld with it at 1/400 sec.

**02**  
**Canon**  
**EF 100mm**  
**f/2.8L Macro**  
**IS USM**  
 WEB: [www.canon.co.uk](http://www.canon.co.uk)  
 PRICE: £630/\$900

**I THINK** I have used this lens more than any other. Apart from the obvious macro uses, I also use it for commercial, portrait and landscape photography. It's such a light lens, too, so even if I'm going out to do landscape work I'll have this lens in the bag as you never know when you will stumble across a really interesting macro subject.

**03**  
**Zeiss**  
**Distagon T\***  
**f/2.8 15mm ZE**  
 WEB: [www.zeiss.co.uk](http://www.zeiss.co.uk)  
 PRICE: £2200/\$2650

**THIS** is my go-to lens for aurora and after-dark photography. The lens is very sharp, even at f/2.8, and the distortion is very well controlled for such a wide-angle lens. It also has a hard stop infinity focus, which means, if I'm out doing aurora photography, I know that if I turn the focus ring fully to the right, all my stars will be sharply in focus.

**04**  
**Canon**  
**EOS-1D X**  
 WEB: [www.canon.co.uk](http://www.canon.co.uk)  
 PRICE: £4500/\$5300

**THIS** is a beast of a camera. The fast focusing system and high frame rate is brilliant for wildlife photography. On the other side I find the camera very usable at ISO6400, which, for aurora photography, allows me to get my shutter speed down to around a second, making my aurora pictures much closer to what you actually see with the eye.

**05**  
**Kenko**  
**Extension**  
**Tube Set**  
 WEB: [www.kenkoglobal.com](http://www.kenkoglobal.com)  
 PRICE: £100/\$129

**I USE** these with a variety of different lenses, from the 100mm macro lens, if I want to magnify the image more than 1:1, to telephoto lenses to reduce the minimum focusing distances and magnify the image. This is especially useful for photographing subjects like snakes, where you don't want to disturb the subject, however, you need to take care of camera shake, as that is magnified too.

**06**  
**Ancient**  
**climbing**  
**carabiner**

**POSSIBLY** my most important piece of kit, if the dog comes with me. I use this carabiner to attach the dog's lead to my belt. She's a 33kg Bouvier des Flandres, and I need both hands free if I'm handholding a large telephoto or lying on the floor doing macro, so I need to know she is firmly attached to me!



# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

“ A tripod has become an essential part of my kit – it can even be handy to rest a reflector against ”

## Victoria Hillman

Wildlife researcher, conservationist and photographer Victoria reveals why there's always space for a decent lunch in her minimalist kit bag

**O**ver the past couple of years I have developed a real interest and love of smaller species, moving away from mammals and birds to reptiles, invertebrates and flowers, and as such I have downsized my equipment and bag.

My bag now consists of one Canon EOS DSLR, two macro lenses (50mm and 100mm), a fisheye lens, extension tubes, my trusty tripod, batteries and memory cards, plus plenty of food and water; I can be out in

the field for 14 hours at a time, so carrying enough for the day is essential to stop any shakes, lapses of concentration and dehydration. Suitable clothing is another area to get right; I wear tough trousers (never shorts) as ticks, gorse and nettles can be a problem, and several thin layers up top. As I spend hours photographing sun-loving species, a hat and high-factor sunscreen are vital; I don't want to risk cutting a day short due to heatstroke.

I'm not just photographing but also documenting, so I carry a notebook and pencil to

record species and any specific or unusual behaviours.

A couple of years ago I never used a tripod, but now it has become an essential part of my kit; even when I'm flat to the ground and don't need it for my camera it can be handy to rest a reflector against, or even as a windbreak with a jumper wrapped around it.

I don't use flash but light subjects in other ways, such as bouncing natural light off reflectors and using LEDs. They need to be small to fit in my bag and also to fit in tight working spaces.

### WHAT DO I DO?



### Victoria Hillman

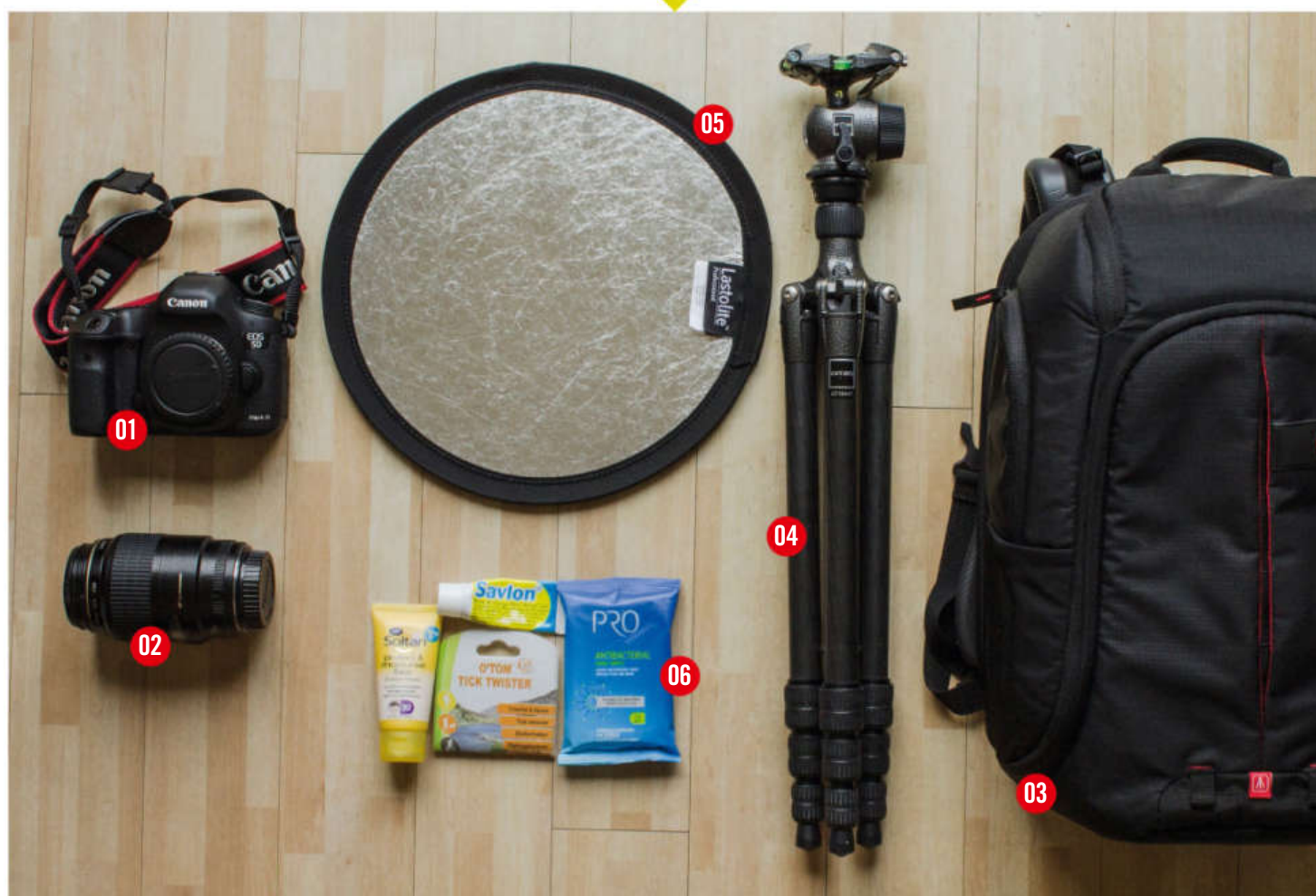
[www.vikspics.com](http://www.vikspics.com)

**I AM** a wildlife researcher and photographer based in Somerset, recording everything I see and submitting these records to help with conservation efforts. I also run workshops and seminars up and down the country, sharing my tips and tricks and encouraging responsible nature photography. I spend my time exploring the countryside photographing reptiles, flowers and bugs in a more artistic and creative way to challenge people's perceptions and encourage them to look beyond the subject.



## CANON PROS &amp; THEIR KIT

## IN VICTORIA'S BAG



01

**Canon EOS 5D Mark III**

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £2200/\$2499

**A RELATIVELY** new addition to my bag but one that I can't imagine not having now! The number of autofocus points, along with other aspects of this camera, have opened up a whole new world of creativity for me as I love to give my subjects plenty of space when composing the shot. This, coupled with its incredible low-light high-ISO capabilities, makes it perfect for my creative style of close-up photography.

02

**Canon EF 100mm f/2.8 USM Macro**

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £373/\$549

**MY** workhorse of a lens I've had for years, it has been through many adventures with me, so is a little battered and old now, but still works beautifully, producing fantastic results. Although I also use a 50mm macro, this lens is my favourite and is very versatile when changing between insects and flowers, allowing me to work close to my subject.

03

**Manfrotto Pro Light Multipro-120 backpack**

WEB: [www.manfrotto.co.uk](http://www.manfrotto.co.uk)  
PRICE: £154/\$170

**SINCE** downsizing the equipment I take into the field, I only need a small bag and the Multipro-120 is perfect for carrying my equipment, food and water. I've dragged this tough bag through many a bush and know it will keep my gear safe when working in tough conditions and habitats, and being lightweight I can reserve my energy for photographing my wildlife subjects.

04

**Gitzo GT1544T Traveller tripod with ball head**

WEB: [www.gitzo.co.uk](http://www.gitzo.co.uk)  
PRICE: £484/\$770

**I ONLY** use a tripod about 70% of the time, but I need something that is lightweight, goes flat to the ground (if you remove the central column), can be positioned quickly and easily in tight spaces, and is up to the job. The ball head allows for small adjustments on all planes, enabling me to be more creative with my compositions.

05

**Lastolite Collapsible Reflector 30cm Silver/White**

WEB: [www.lastolite.co.uk](http://www.lastolite.co.uk)  
PRICE: £13/\$32.50

**I PREFER** using natural light, which is reduced in such close working conditions, so I use the reflector to bounce the light onto my subject. Working in tight spaces with small animals, 30cm is just the right size to squeeze under or next to my subject, and is perfect for adding a soft light for flowers or a brighter light to bring out the iridescence of butterfly wings.

06

**First Aid Kit**

**MUCH** of my work involves crawling around in long grass, getting through gorse, brambles and stinging nettles, so my first aid kit is an important member of my team, to minimize infection or itching. In my kit I have tick tweezers (just in case – there's a lot around in the long grass), high-factor sunscreen, antibacterial wipes and Savlon Bites & Stings Pain Relief Gel.



# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

I couldn't live without my Canon EF 85mm f/1.2L lens

## Andrea Denniss

Portrait photographer Andrea Denniss won't venture anywhere without some treats for her subjects, her four favourite Canon lenses, and some carrier bags. . .

**move around a lot whilst shooting, as do my clients, so I don't want to be weighed down with a huge collection of equipment.**

There are just four Canon lenses in my bag – the EF 70-200mm f/2.8L IS USM, EF 85mm f/1.2L USM, EF 35mm f/1.4L USM and EF 24-105mm f/4L IS USM – and they cover all I need to capture everything from running toddlers and animals with a great zoom, to a wider option that can capture my clients in the beautiful landscape with

me close enough by so I can communicate with them.

The camera equipment is essential but there are other items that are incredibly useful and help me to create the images my clients will love. I always have treats in my bag for horses and dogs. There have been many times that they've turned a difficult dog into a willing model! You can do a lot with hidden Polo mints during a horse shoot too. Getting horses' attention can sometimes be a challenge, but a small plastic container filled with dried peas makes

a lovely rattling noise that will pop those ears forward – it may just be for a second, but that's all I need. If it doesn't work then a polythene bag can be useful to flap around, but be careful; some horses may bolt in the other direction!

I also love to use props in my shoots and my favourites are vintage cameras. I also have a suitcase and tin bath in the car. Children love to play with them and the tin bath gives me the opportunity to contain high-energy little ones long enough to capture that perfect portrait.



**Andrea Denniss**

[www.pinklilyphotography.co.uk](http://www.pinklilyphotography.co.uk)

I run a portrait business in North Yorkshire where I love to capture families, children and their four-legged friends in our beautiful countryside, as well as boudoir indoors. It's exciting to exploit the seasonal changes in light and landscapes as we move from winter to summer and back again. I also run a number of courses with Aspire Photography Training, including Getting Started in Photography and the A-Z of Photography and Business. I also love training people on a one-to-one basis.



## IN ANDREA'S BAG



### 01 Canon EF 70-200mm f/2.8L IS USM

[www.canon.co.uk](http://www.canon.co.uk)  
£1499/\$2099

**I SHOOT** lots of kids, dogs and horses – all of which can run much faster than me. I am usually found sat on the ground with this lens, which allows me to be relatively unobtrusive when working with children who may not be so keen on having their photo taken. Its ability to hold f/2.8 through its zoom range is crucial, and I can be sure that images will be sharp and have beautiful bokeh.

### 02 Canon EF 85mm f/1.2L II USM

[www.canon.co.uk](http://www.canon.co.uk)  
£1499/\$1999

**IF THERE** was one lens that I couldn't live without, it would be this one – for me, it's the perfect portrait lens. It's fast and super sharp, and the bokeh is just incredible, with its ability to open up as far as f/1.2. It's invaluable for those beautiful portraits, and I couldn't shoot boudoir indoors in low light without it.

### 03 Interfit 5-in-1 Collapsible Reflector 42in

[www.interfitphotographic.com](http://www.interfitphotographic.com)  
£25/\$35

**LIGHT** is everything when it comes to photography, and before I venture down the artificial light road I make the most of what I've got. As this is a 5-in-1 reflector I can bounce light in to an image using the silver, gold or white sides, block light with the black side, and use it without its covers as a diffuser. I always have one or two with me on a shoot.

### 04 Polythene Bag

**I AM** a lifestyle photographer who works out and about and in all weathers. I frequently find the perfect shot that will leave my subjects with wet bottoms for the rest of their shoot. The solution is an easy one: I have a number of polythene bags with me that a subject can sit on, which can then be tucked out of sight. They are also very useful if rattled or waved about a bit for getting those horsey ears to pop forward for a better a shot.

### 05 Treats

**A LARGE** part of my work is photographing horses and dogs, and capturing the amazing bond that my clients have with them. My kit bag always has a number of treats in it, which allows me to keep those furry friends' attention and create those 'loving' shots – I think my grandma called it 'cupboard love'. Polo mints never fail with horses, and good old doggy gravy bones are always a hit.

### 06 Props

**IT CAN** sometimes be difficult to get a shy or determined child to engage and enjoy a photo shoot and the best thing I have found is to involve them as much as I can. I am always on the lookout for things I can use in my shoots and old cameras are perfect. This one I picked up for £2 (\$3) and the shutter button still works, so kids can click away. I say to them: "You can take my picture and I can take yours."



# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

“ The technology makes life easier, but it's important it doesn't hinder; synergy with mind and camera is the key ”

## David Clapp

Travelling light isn't an option for landscape and travel photographer David Clapp. In addition to all the camera kit, these days he even takes the office with him. . .

**W**orking as a landscape and travel photographer means I shoot a wide range of subjects in all kinds of conditions, and this requires a lot of kit and a heavy bag. I'm a 'long haul lugger' and I find it hard to refine things down!

My 'bare minimum' kit comprises three camera bodies and nine lenses. I take two Think Tank bags with me everywhere: one 'airport' bag (Airport Acceleration V2) which stays in the hotel, and a

smaller day bag (Streetwalker Pro) into which I decant the kit I need for the day.

I use heavyweight Gitzo tripods – a 6x 5540 and a smaller 4543, with a levelling base, as large-reproduction panoramic images are a very important part of my work. Canon ISO technology has always been world-class, so I leave the tripod behind in the day and shoot hand-held at higher ISOs, especially on travel assignments.

Then there are all the leads, chargers and cleaning kit, plus the computer. I've abandoned

the idea of having an office now, and I do all my 'office' work and image processing on a top-spec MacBook Pro, anywhere there's a plug socket and a flat surface – from my kitchen table to airports, car seats in the Arctic and, recently, a super yacht in the Med. Internet access is crucial, so I run a 4G iPhone/iPad Mini system which I use for personal Wi-Fi hotspots.

The technology makes life easier, and it opens doors to creativity, but it's important it doesn't hinder; synergy with mind and camera is the key.

### WHAT DO I DO?



### David Clapp

[www.davidclapp.co.uk](http://www.davidclapp.co.uk)

**I AM** a landscape, travel and architectural photographer based in South Devon. I regularly work abroad, although I'm still obsessed with Dartmoor, where my photographic journey began in 2003. I work regularly for Canon UK, and run photo tours for workshop company Light and Land as well as my own tours. I sell my pictures worldwide through Getty Images, and I'm known for my moonlight and infrared photography. I don't specialize in one area, so I tend to do a bit of everything!



## IN DAVID'S BAG



01

### Canon EOS-1D X

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £4499/\$4599

**THIS IS** my night vision and extreme weather camera. My 6D is a great camera, but it was struggling out in Finland recently, where temperatures reached -25C, and the 1D X performed flawlessly in extremes as low as -40C. I use it to shoot the aurora borealis, stars and moonlit scenes because of its incredible high-ISO performance, but it also produces beautiful landscape images thanks to its fabulous dynamic range.

02

### Canon EOS 6D

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £1139/\$1399

**WITH GPS** and Wi-Fi, this camera suits me above all other bodies. The creative potential it can release is utterly remarkable. From light-painting standing stones using my iPhone as a remote monitor, to fast, unobtrusive travel photography, it's an understated wolf in sheep's clothing. The quality of the full-frame sensor makes well-exposed shots look remarkable, and I can't imagine my professional life without it – although I may well upgrade to a 5DS soon.

03

### Canon EOS 6D (IR conversion)

WEB: [www.advancedcameraservices.co.uk](http://www.advancedcameraservices.co.uk)

PRICE: Camera £1139/\$1399  
Conversion £350/\$350 approx

**THIS CAMERA** was bought to replace a 5D Mk I that I had converted for infrared photography for a magazine article in 2010. I've been an infrared addict ever since, and I upgraded to this 6D converted for IR, enhancing my love of the medium with Live View and great high-ISO capability. Infrared photography is an interpretive medium that can produce incredible results.

04

### Canon TS-E 24mm f/3.5L II

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £1450/\$1899

**I'VE USED** this lens so much that I had to have the entire tilt-shift mechanism replaced. It's the most versatile lens that Canon produces in my opinion – from landscapes and seascapes to architecture, I can use it to stitch 2.5:1 panoramas from a simple shift left and right. The tilt adjustment takes some working out, but once conquered it opens doorways to limitless creativity. It's an absolute gem.

05

### Canon EF 16-35mm f/4L IS USM

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £729/\$1099

**THIS IS** the lens we've all been waiting for. It's the sharpest, most versatile wide-angle lens made by any manufacturer. It can be used wide-open at 16mm and produce images that are staggeringly sharp from corner to corner. The inclusion of Image Stabilization is a real bonus for travel photographers – taking a deep breath, I can shoot hand-held as slow as 1/4 sec and still get sharp results.

06

### Canon EF 70-300mm f/4-5.6L IS USM

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £729/\$1099

**THIS SMALLER,** compact L-series zoom is one of the most important lenses in my kit bag. I was an avid 70-200 f/4L IS user until this lens was released, but I found myself constantly reaching for my 1.4x extender. This lens is so compact that it can fit inside my camera bag. It's very sharp, and resolves the detail in images on the new 50Mp 5DS R. A superb optic for all genres.



# PROKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

// I'm often in dark venues, wet festivals or manic studios, so my kit needs to adapt to what I'm shooting //

## Adam Gasson

Music photographer Adam Gasson won't consider attending any wet and muddy festivals – well, not without his coffee maker and few other essentials. . .

**T**here aren't many photography genres as demanding as shooting music.

I'm often working in very dark venues, wet festivals or manic studios, so my kit needs to adapt to what I'm shooting.

I'm always reaching for my f/2.8 variants of Canon's 24-70mm and 70-200mm. They're both sharp wide open, with great autofocus. When it gets really dark I've got a Canon 50mm f/1.2L, which is wonderfully sharp with an unrivalled bokeh and is

perfect for low-light portraits where Speedlites aren't an option. The new Sigma 35mm f/1.4 Art lens is incredible value for money – very sharp, well built and with great AF.

When you combine these fast lenses with the high-ISO performance of the 5D Mk III, there really isn't much that can't be captured. It performs good enough at ISO6400 for pro work and, with its full-frame sensor, has the quality I need for studio shoots as well.

After I edit on location with my MacBook Pro (using Photo Mechanic and Photoshop) it's

all backed up on a Cisco NSS 324 network drive, which connects to my home network and holds four hard disks, so if one fails the data isn't lost. I can access my files remotely, so I'm never too far from my images; it adds real peace of mind to my workflow.

My kit has been fine-tuned over the years to be portable enough to carry it all on my own. Between my f-stop Loka and a Storm roller case I can take enough kit to cover live shots and backstage portraits without breaking my back – or my precious gear!

WHAT DO I DO?



**Adam Gasson**

[www.adamgasson.com](http://www.adamgasson.com)

**IT WAS** during my studies at Cardiff University in 2003 that I realized I could combine my two passions – photography and live music. After shooting for the student paper I started getting paid work for *NME*, Carling, Red Bull and others, enabling me to turn professional in 2004. Music photography has taken me around the world (including a gig at 43,000ft aboard a Boeing Dreamliner for Virgin Atlantic) and, over a decade on, I'm still shooting for magazines, papers and brands around Europe.



## IN ADAM'S BAG



### 01 F-stop Loka backpack

WEB: [www.fstopgear.com](http://www.fstopgear.com)  
PRICE: £195/\$250

**THE** Loka set me back £350 when I bought it (it's been replaced by the Loka UL since, price given above), and although it may not be cheap it's worth every penny. It has a metal internal frame, so feels really comfortable, even when walking around a festival for days. It's cavernous and comfortably takes all my camera kit, light stands and more!

### 02 Profoto Acute B2

WEB: [www.profoto.com](http://www.profoto.com)  
PRICE: £1500/\$1300

**I NEED** my kit to be portable but reliable and the Acute B2 fits the bill. It's powerful, up to 600Ws, and incredibly consistent. I use two packs for my portrait shoots along with Profoto light modifiers.

### 03 Canon EOS 5D Mk III

WEB: [www.canon.co.uk](http://www.canon.co.uk)  
PRICE: £2249/\$2499

**THE** EOS 5D Mark III is a bit of a jack of all trades camera, which suits my style of photography perfectly. It performs really well in low light, with both high ISO performance and good AF, has the quality you need for studio work, shoots HD video, and is weather sealed.

### 04 Vic Firth earplugs

WEB: [www.vicfirth.com](http://www.vicfirth.com)  
PRICE: £20/\$15

**AN** occupational hazard of working with musicians is loud music! Anyone shooting live music, even if it's just one gig, should wear ear protectors of some sort. I've been using Vic Firth earplugs for years and they do a great job of blocking the damaging levels of music but still allowing you to hear people talk – useful for when security are trying to warn you of an incoming crowd surfer!

### 05 Huawei 4G Mobile Wi-Fi

WEB: [www.huawei.com](http://www.huawei.com)  
PRICE: £100/\$125

**QUITE** often when I'm shooting live music I'll need to send the images back to a picture desk or art editor quickly, so having a reliable and fast 4G modem is a must. The Huawei models do a great job and are small enough to easily fit in your camera bag.

### 06 Aeropress coffee maker

WEB: [www.aeropress.co.uk](http://www.aeropress.co.uk)  
PRICE: £25/\$30

**WHEN** I'm away shooting at festivals or staying overnight on foreign trips I miss my home comforts, especially my morning coffee. The Aeropress makes a great espresso and packs down smaller than a 24-70mm lens!

# GearTest

Beginner EOS DSLRs	154
Wide-angle zooms	166
Portrait primes	178
Canon EOS 5DS & EOS 5DS R	190
Macro lenses	198
E-TTL Flashguns	210



210





154



178

## THE CONTENDERS



**Canon EOS  
1200D/Rebel T5**  
£230/\$320



**Canon EOS  
100D/Rebel SL1**  
£280/\$400



**Canon EOS  
700D/Rebel T5i**  
£400/\$650



**Canon EOS  
750D/Rebel T6i**  
£520/\$750





# BEGINNER EOS DSLRs

*Getting into the world of DSLR photography doesn't have to cost a fortune. We put Canon's most cost-effective EOS beginner bodies through their paces in our in-depth lab tests...*

Over the last couple of years Canon has launched some seriously sophisticated DSLR cameras at very competitive prices. All boast advanced features, such as Full HD movie capture and the 'Live View' mode to help you compose shots on the rear LCD. All the cameras in our test group have a lightweight and compact yet sturdy build, and all have high megapixel-count sensors – from 18Mp on the EOS 100D, 1200D and 700D, to 24Mp on the newest and most advanced EOS 750D.

Stabled in Canon's lineup as 'EOS for Beginners', these cameras are wonderfully intuitive, even for complete novices. All have built-in feature guides to demystify complex menu options, while the newer 1200D and 750D have companion apps which you can download to a smart device. Even in fully automatic mode, they all feature Canon's Scene Intelligent Auto system, which analyses compositions in real time and adjusts shooting parameters as necessary for the best results. Plentiful scene modes help to tailor settings to specific requirements, while the 'Creative Auto' mode helps bridge the gap between basic and 'creative' zone settings like Shutter Priority and Aperture Priority.

Ultimately, these cameras can grow with you as you learn, while giving you access to the vast range of Canon lenses, flashguns and accessories. Let's pick out the best buys...





## CANON EOS 1200D

The most basic of Canon's entry-level cameras, the 1200D combines new and established technologies

**A** year newer than the 100D and 700D, this camera was originally launched back in early 2014. It's a major revamp of the older 1100D, which had a relatively low megapixel count of 12.2Mp and could only stretch to 720p video capture. The 1200D is a much more modern affair that adds a Scene Intelligent Auto shooting mode, creative filters like Grainy Black & White, and matches the 100D and 700D with a 18Mp image sensor and Full HD video recording.

Despite its relative youth compared with the 100D and 700D, the 1200D nevertheless has a budget-friendly selling price. Scratch the surface and you'll soon find that some of the features and specifications are more dated, or absent altogether. For example, it has an older-generation Digic 4 image processor that harks back to the 500D, launched in 2009.

Further shortcomings compared with all the other cameras in the group include a lack of a touch-sensitive screen – and the screen that is present has a relatively low resolution of 460,000 dots. The 1200D is also the only camera that lacks 'Hybrid CMOS AF', so

The 18-55mm kit lens is the old IS II version; the 100D and 700D come with the newer, faster-focusing STM (stepping motor) model

The EOS 1200D's rear LCD is a non-touchscreen, low-res unit

continuous autofocus isn't available when you're shooting movies. Some of the finer points of custom functions are also absent, including the Mirror Lockup option which helps to minimize blurring from mirror-bounce, especially in tripod-mounted shots. The range of scene modes is also comparatively limited, and we particularly missed the in-camera HDR (high dynamic

### SPECIFICATIONS

<b>SENSOR</b>	18Mp APS-C CMOS (1.6x crop)
<b>IMAGE PROCESSOR</b>	DIGIC 4
<b>AF POINTS</b>	9 (1 cross-type)
<b>ISO RANGE</b>	ISO100-6400 (12800 exp)
<b>METERING ZONES</b>	63
<b>HD VIDEO</b>	Full HD at 30, 25, 24fps
<b>VIEWFINDER</b>	95% coverage, 0.80x magnification
<b>MEMORY CARD</b>	SD/SDHC/SDXC
<b>LCD</b>	3-inch 460K-dot fixed
<b>MAX BURST</b>	69 JPEGs or 6 Raws at 3fps
<b>WI-FI/NFC</b>	No/No
<b>SHUTTER SPEEDS</b>	30-1/4000 sec, bulb
<b>SIZE</b>	130x100x78mm
<b>WEIGHT (BODY)</b>	480g
<b>WEB</b>	www.canon.co.uk
<b>PRICE</b>	£230/\$320 (body only)







## FEATURES

**01** The shooting mode dial lacks the 'SCN' setting for additional scene modes that's present on the other three cameras.

**02** Typical of entry-level cameras, there's a pop-up flash module as well as a hotshoe.

**03** It's the only camera in the group that lacks a touch-sensitive screen; the screen is relatively low-res as well.

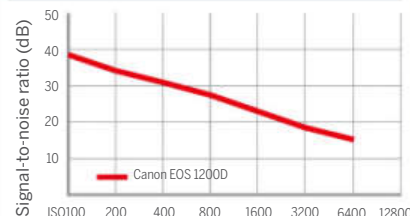
**04** Rear panel controls have a conventional layout, with cross keys doubling up to provide access to shooting settings.

**05** The LP-E10 battery enables 500 shots on a full charge.

**06** It's the only camera in which the SD/SDHX/SDXC slot isn't UHS-1 compatible, but it's not really a problem with the slow 3fps max burst rate.

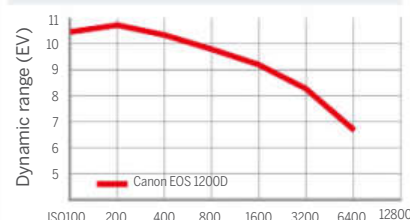
## 1200D LAB TESTS

## RAW\* SIGNAL-TO-NOISE RATIO



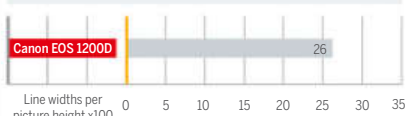
The 1200D lags behind Canon's other budget options, with image noise being more noticeable at ISO1600 and above

## RAW\* DYNAMIC RANGE



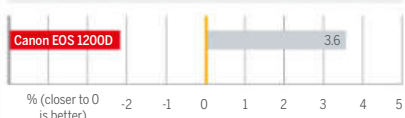
There's not quite as much dynamic range as from other cameras at low ISOs, and it drops off more at the mid-to-high ISOs

## RAW\* RESOLUTION (AT ISO200)



With the same megapixel count as the 100D and 700D, the 1200D's resolution score is only really beaten by the 750D

## COLOUR ERROR



In lab conditions colour accuracy is good, and similar to the 700D, but in general shooting colours can look desaturated

## VERDICT

The 1200D is the outright cheapest DSLR in Canon's current line-up. It's not bad value, but it's the least impressive in the group for features, performance and outright image quality.

## FEATURES

## BUILD &amp; HANDLING

## IMAGE QUALITY

## VALUE

## OVERALL



range) mode that's featured in all of the other cameras in our group.

## Build and handling

A little larger than the dinky 100D, the 1200D feels less cramped in the hand, and it has a more mainstream layout of controls. For example, the cross-keys at the lower right of the back panel double up in function, so they can give direct access to ISO, autofocus mode, white balance and drive mode, as well as being used for menu navigation.

The camera's weight is a modest 480g, making it a full 100g lighter than the 700D, although not as light as the 407g 100D. It has the best

stamina of any camera in the group, with a fully-charged battery good for around 500 shots.

## Performance

The 9-point autofocus module is basic but reasonably effective, with one cross-type point at the centre. The sensitivity range is a little limited at ISO100-6400 (12800 expanded) on account of the older processor, and image noise is more noticeable at high ISOs. The max burst rate in Continuous drive mode is pedestrian at 3fps (frames per second), again losing out to the other budget options. Image quality is good rather than great, with colours noticeably lacking vibrancy.



ISO6400 is at the top of the 1200D's standard range, and noise is clearly visible in this low-light interior



Blues, greens and other colours look rather insipid compared with all the other cameras on test



## CANON EOS 100D

They say the best things come in small packages, but is the 100D capable of punching above its modest weight?

**A**vailable in black or white, complete with colour-coordinated 18-55mm kit lens, the 100D's main claim to fame is that it's the smallest DSLR Canon has ever made. Compared with the still fairly streamlined 133x100x79mm dimensions of 700D, the 100D measures just 117x91x69mm, and sheds many grams in the process. At 407g (body only), it's a real lightweight, but in a good way; in fact, it's only about two-thirds the weight of the 700D, but it feels equally solid and robust.

Under the skin there are marked similarities between the 100D and 700D. Both were launched in early 2013 and feature 18Mp image sensors coupled to late-generation Digic 5 processors, along with a generous sensitivity range of ISO 100-12800 (25600 expanded). In some specifications, the 100D falls between the 1200D and 700D. For

example there's a 9-point autofocus module with just one (more sensitive) cross-type point at the centre, which also has a higher-sensitivity capability for lenses with an f/2.8 aperture (or wider). The 1200D lacks the extra sensitivity in its single cross-type point, whereas

If you want to stand out from the DSLR crowd, the 100D is available in white as well as black

The smaller 100D has different, more simplified layout to squeeze in all the buttons

the 700D also has a 9-point AF module, but all of the points are cross-type with an f/2.8 point at the centre. Similarly, the 1200D and 700D have maximum burst rates of 3fps and 5fps respectively; the 100D falls in between at 4fps.

### Build and handling

Pick up the 100D and the reduction in size and weight is immediately

### SPECIFICATIONS

<b>SENSOR</b>	18Mp APS-C CMOS (1.6x crop)
<b>IMAGE PROCESSOR</b>	DIGIC 5
<b>AF POINTS</b>	9 (1 cross-type)
<b>ISO RANGE</b>	ISO100-12800 (25600 exp)
<b>METERING ZONES</b>	63
<b>HD VIDEO</b>	Full HD at 30, 25, 24fps
<b>VIEWFINDER</b>	95% coverage, 0.87x magnification
<b>MEMORY CARD</b>	SD/SDHC/SDXC (UHS-1)
<b>LCD</b>	3-inch 460K-dot fixed
<b>MAX BURST</b>	28 JPEGs or 7 Raws at 4fps
<b>WI-FI/NFC</b>	No/No
<b>SHUTTER SPEEDS</b>	30-1/4000 sec, bulb
<b>SIZE</b>	117x91x69mm
<b>WEIGHT (BODY)</b>	407g
<b>WEB</b>	www.canon.co.uk
<b>PRICE</b>	£280/\$400 (body only)







## FEATURES

01

The sculpting of the finger grip is relatively shallow, and the Main dial is more in line with the ISO button than on the 700D.

02

The SCN option on the mode dial adds extras like Kids, Food, Candlelight and HDR.

03

With its relatively narrow build there's no room for a vari-angle LCD, but you do get a high-res, touch-sensitive screen.

04

A simple directional pad replaces the usual four cross keys, and doesn't give direct access to shooting settings.

05

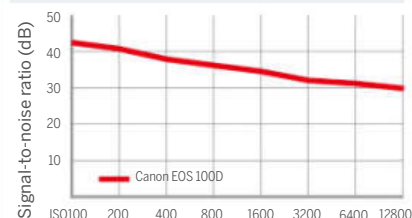
The Set button doubles up to give access to the Quick menu, saving space.

06

The 100D's LP-E12 battery only delivers around 380 images on a full charge.

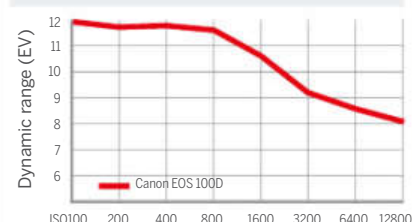
## 100D LAB TESTS

## RAW\* SIGNAL-TO-NOISE RATIO



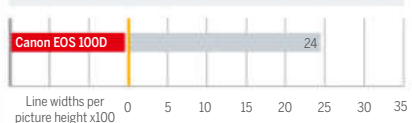
The 100D edges ahead for Raw noise performance but, in practice, images are similarly noise-free as from the 700D

## RAW\* DYNAMIC RANGE



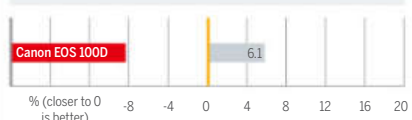
Again, dynamic range is almost identical to the 700D, with good results that only really start to drop off at ISO3200

## RAW\* RESOLUTION (AT ISO200)



The 100D is outclassed for resolution by the 750D, but holds its own against the 700D right through the sensitivity range

## COLOUR ERROR



Here again performance is similar to the 700D. Colour rendition is accurate and very lifelike, with just a hint of warmth

## VERDICT

Not just one for the road, the 100D packs plenty of punch into a small, light and travel-friendly build. It's very competitively priced, although, in some respects, the 700D has more to offer.

## FEATURES

## BUILD &amp; HANDLING

## IMAGE QUALITY

## VALUE

## OVERALL



obvious. Indeed, the layout of buttons at the rear bucks tradition for this class of Canon DSLR, enabling sufficient space to be maintained for the thumb grip area. As such, the AF point selection and exposure/flash lock buttons are shifted towards the edge of the body. The normal provision of four individual cross keys is replaced by a four-way pad that doesn't give direct access to shooting settings such as white balance and drive mode.

Making up for the lack of direct controls is Canon's excellent Quick Control menu, which gives easy access to key shooting settings. The 'Q' menu is even easier to use than in the 1200D, thanks to a screen

that's both touch-sensitive and has a much higher resolution.

## Performance

For optimum autofocus accuracy in regular shooting when using the viewfinder it's best to stick to the 100D's central AF point, as it's the only cross-type point. However, Live View and movie autofocus benefit from a second-generation hybrid AF system that's faster than the 700D's. Image quality is a step up from the 1200D, and comes close to that of the 700D. The auto picture style option gives vibrant yet natural images in wide-ranging conditions, and image noise is well contained even at high ISOs.



Noise is well suppressed for clean-looking images, even at ISO6400 in low light indoor scenes



The Canon EOS 100D produces noticeably punchier and more saturated images than the 1200D



## CANON EOS 700D

A feature-packed and powerful beginner's EOS camera, with a screen that ensures it looks good from any angle

**W**ith a full-sized body that's almost identical in its dimensions to the 1200D and 750D, the 700D is nevertheless heavier than both other cameras, mainly due to having a stainless steel rather than aluminium alloy chassis. The high-quality glass-fibre reinforced polycarbonate shell is more typical, as used in the design of all cameras in the group, as well as some upmarket bodies like the 70D and 6D.

An impressive feature list includes an 18Mp image sensor (typical for APS-C format Canon cameras launched a couple of years ago), Digic 5 image processor, Full HD movie capture, and extensive ranges of scene modes and creative filters. Advanced scene modes include the now ubiquitous HDR (high dynamic range) option, which merges multiple bracketed exposures, while creative filters

include the likes of Grainy Black & White and Toy Camera effects.

### Build and handling

The 700D has a more natural grip thanks to its bigger size compared with the 100D, for large-handed photographers in particular. Another bonus is the excellent rear

The 700D's stainless steel chassis helps to make it the heaviest of Canon's beginner cameras

The rear LCD is a touchscreen, vari-angle unit that's helpful for shooting at awkward angles

screen, which matches the size, resolution and touch-sensitive operation the 100D's, while also adding vari-angle movement – this enables Live View or movie shooting from any angle, or even for shooting around corners. It's also great for taking the compulsory selfies, as well as enabling you to fold away the active surface of the screen for

### SPECIFICATIONS

<b>SENSOR</b>	18Mp APS-C CMOS (1.6x crop)
<b>IMAGE PROCESSOR</b>	DIGIC 5
<b>AF POINTS</b>	9 (1 cross-type)
<b>ISO RANGE</b>	ISO100-12800 (25600 exp)
<b>METERING ZONES</b>	63
<b>HD VIDEO</b>	Full HD at 30, 25, 24fps
<b>VIEWFINDER</b>	95% coverage, 0.85x magnification
<b>MEMORY CARD</b>	SD/SDHC/SDXC
<b>LCD</b>	3-in 1,040K-dot vari-angle touchscreen
<b>MAX BURST</b>	22 JPEGs or 6 Raws at 5fps
<b>WI-FI/NFC</b>	No/No
<b>SHUTTER SPEEDS</b>	30-1/4000 sec, bulb
<b>SIZE</b>	133x100x79mm
<b>WEIGHT (BODY)</b>	580g
<b>WEB</b>	www.canon.co.uk
<b>PRICE</b>	£400/\$650 (body only)







## FEATURES

**01** As is typical, the shooting mode dial is divided into basic zone and creative zone settings.

**02** As on the 100D and 750D, the main on/off power lever also gives access to the movie mode.

**03** The rear layout is practically identical to the EOS 750D.

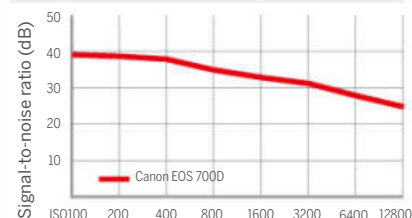
**04** The 700D's vari-angle touchscreen enables you to compose shots from almost any angle.

**05** As is the case on all the cameras in this group, the Live View button also acts as a start/stop record button when you're shooting movies.

**06** The viewfinder's proximity sensor for turning off the screen when the camera is raised to the eye is absent on the newer 750D.

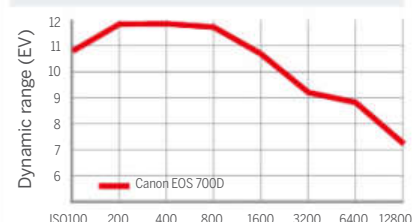
## 700D LAB TESTS

## RAW\* SIGNAL-TO-NOISE RATIO



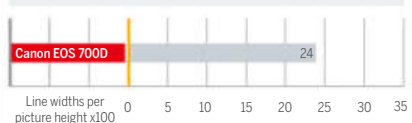
Typical of its generation of Canon DSLRs, noise is well controlled even at high ISO settings of ISO6400 and above

## RAW\* DYNAMIC RANGE



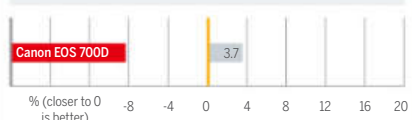
Dynamic range is an almost exact match to that of the 100D, both cameras edging ahead of the 750D at mid-to-high ISOs

## RAW\* RESOLUTION (AT ISO200)



There's nothing to choose in resolution scores when comparing the 1200D, 100D and 700D; they perform equally well

## COLOUR ERROR



Scores for colour accuracy are slightly better than from the 100D, but it's hard to see any difference in actual images

## VERDICT

The 700D is nearly twice the price of the 1200D but it's well worth the extra, with more sophisticated features. It handles better than the 100D, but there's no real difference in terms of image quality.

## FEATURES

## BUILD &amp; HANDLING

## IMAGE QUALITY

## VALUE

## OVERALL



greater protection when the 700D is packed inside your bag.

The control layout is more traditional than in the 100D, and enables quicker access to shooting settings. For example, the cross keys are on hand for navigating the menus but also give access to white balance, AF mode, picture styles and drive mode. It's intuitive enough for absolute beginners, while also catering for proficient photographers who want to take control of advanced settings.

## Performance

Well suited to sports and action photography, the 700D turns in a maximum continuous shooting

speed of 5fps, outstripping both the 1200D and 100D, and equalling the 750D. However, there's only enough buffer capacity for six shots in Raw quality mode, compared with the 750D's eight shots, which also have a higher megapixel count and therefore a bigger data size.

Autofocus performance is better than in the 1200D and 100D, with greater accuracy when using off-centre AF points. This is because all of the 700D's nine AF points are cross-type and so able to focus on detail in both the vertical and horizontal planes. The 700D keeps going for longer than the 100D as well, with a battery life of 440 shots on a full charge.



The 700D produces similar results to the 100D at ISO6400, with clean, largely noise-free images



Image quality is similar to that from the 100D, with very good colour rendition, contrast and sharpness



## CANON EOS 750D

Good, better or best? Let's see how the new and improved 750D fits into Canon's 'beginner' lineup

**A**ccording to Canon, the new 750D comes off second-best in the current line-up of 'beginner' cameras, losing out to the more feature-rich 760D. However, apart from a few additions like the 760D's top-plate info LCD and secondary command dial, both cameras are essentially identical. To our way of thinking, the 760D's extra features and higher price put it more in the 'enthusiast' sector, alongside models like the 70D – all of which makes the 750D potentially the latest and greatest beginner's DSLR.

Headline attractions include a new, high-res 24.2Mp image sensor that's a significant step up from the 18Mp sensors in the 1200D, 100D and 700D. Next up there's the very latest generation of Digic 6 image processor, again beating the other three contenders. Autofocus is yet another upgrade, with a 19-point

phase-detection module in which all points are cross-type. The Hybrid CMOS autofocus system for Live View and movie capture also gets a revamp, with the new third-generation system being significantly faster than those used in the 100D and 700D. The metering system is new and the 750D is also better connected,

With the 750D you get a choice of two EF-S kit lenses: the 18-55mm f/3.5-5.6 IS STM, or the 18-135mm f/3.5-5.6 IS STM pictured here

The vari-angle touchscreen on the Canon 750D is the same as the 700D's

adding built-in Wi-Fi and NFC (Near Field Communication).

### Build and handling

The 750D inherits the 700D's rear layout, complete with an excellent touch-sensitive vari-angle screen. The intuitive rear button layout is practically identical, but there are changes on top. Whereas the 700D has a single button in front of the

### SPECIFICATIONS

<b>SENSOR</b>	24.2Mp APS-C CMOS (1.6x crop)
<b>IMAGE PROCESSOR</b>	DIGIC 6
<b>AF POINTS</b>	19 cross-type
<b>ISO RANGE</b>	ISO100-12800 (25600 exp)
<b>METERING ZONES</b>	63
<b>HD VIDEO</b>	Full HD at 30, 25, 24fps
<b>VIEWFINDER</b>	95% coverage, 0.82x magnification
<b>MEMORY CARD</b>	SD/SDHC/SDXC (UHS-1)
<b>LCD</b>	3-in 1,040K-dot vari-angle touchscreen
<b>MAX BURST</b>	940 JPEGs or 8 Raws at 5fps
<b>WI-FI/NFC</b>	Yes/Yes
<b>SHUTTER SPEEDS</b>	30-1/4000 sec, bulb
<b>SIZE</b>	132x101x78mm
<b>WEIGHT (BODY)</b>	555g
<b>WEB</b>	www.canon.co.uk
<b>PRICE</b>	£520/\$750 (body only)







## FEATURES

**01** The autofocus point selection button is a welcome addition, making the most of the 750D's 39-point AF system.

**02** The DISP. button turns the LCD on and off, in the absence of the 700D viewfinder's proximity sensor.

**03** The layout of the controls on the rear panel is practically identical to the 700D, which is no bad thing.

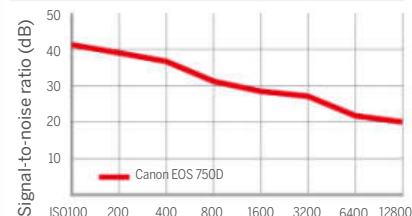
**04** The 750D's fully articulated vari-angle touchscreen LCD is a joy to use.

**05** The 750D is the only 'beginner' camera with built-in Wi-Fi, and there's NFC connectivity too.

**06** Live View shooting and movie capture benefit from the faster, third-generation hybrid autofocus system.

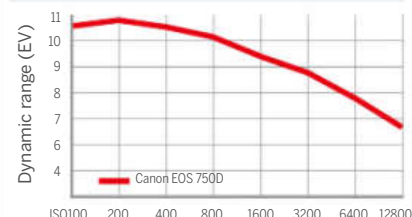
## 750D LAB TESTS

## RAW\* SIGNAL-TO-NOISE RATIO



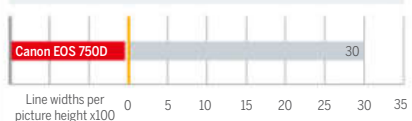
Low light images taken at very high ISOs are as clean as from the 700D and 100D, despite the higher megapixel count

## RAW\* DYNAMIC RANGE



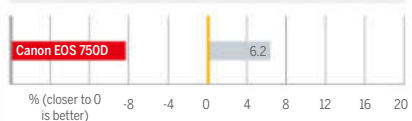
Dynamic range is similarly impressive to the lower-resolution 100D and 700D, even at high sensitivity settings

## RAW\* RESOLUTION (AT ISO200)



The 750D leads the field by some distance, retaining much more fine detail in shots than the other cameras on test

## COLOUR ERROR



Colour accuracy is very good, with the 750D producing slightly more saturated, punchier shots than the 100D and 700D

## VERDICT

With more megapixels, better AF and metering and built-in Wi-Fi, the 750D overtakes the 700D as Canon's top beginner camera. Image quality is superb, and it's very good value.

## FEATURES

## BUILD &amp; HANDLING

## IMAGE QUALITY

## VALUE

## OVERALL



shooting mode dial, for ISO, the 750D has three. As well as the ISO button you get a DISP. button for turning the LCD screen on or off, although we prefer the 700D's proximity sensor, which does this automatically. The third button is for AF Area Selection, as seen on Canon's recent upmarket DSLRs. This enables switching between single-point, selective zone, and full 39-point automatic selection, and it's good to have, especially considering the much greater number of AF points available than on the other beginner cameras.

Thanks to the newer generation of processor and larger memory buffer, the 750D is able to match

the 700D's maximum burst rate of 5fps despite its higher megapixel count, as well as enabling bursts of up to eight Raw-quality images.

## Performance

Lab tests and real-world shooting both confirm that the 750D easily beats the other cameras in the group for retention of fine detail and texture – the new camera really does make the most of its greater megapixel count. It also manages to retain detail well at high ISOs while effectively suppressing noise. Last, but not least, the new metering system gives more consistent and predictable image results.



Wonderfully crisp and vibrant, this indoor image is typical of the 750D, with excellent retention of detail



The 750D produces colour-rich images, as well as retaining more fine detail than the 100D and 700D

## THE WINNER IS... CANON EOS 750D

It has youth on its side, and excels in terms of features and image quality

**W**hen it comes to digital cameras, the march of progress often seems like a marathon that's run at sprinting pace. Two years newer than the 100D and 700D, the 750D is a much more sophisticated camera. Pretty much every key area has been upgraded and revamped, from the image sensor and image processor to the dual autofocus systems and the metering system. All of these elements combine to deliver the best image quality and the most

impressive overall performance we've ever seen from a 'beginner' DSLR.

Let's not forget that the 1200D is a year newer than the 100D and 700D, but it has an older-generation image processor than both of those cameras, and a relative lack of clever features or advanced functions. Getting back to the clear winner of the group, the 750D is also the only camera of the four that sports built-in Wi-Fi and NFC for better-connected photography.



## WHAT'S YOUR BEST OPTION?

All the cameras in this group have something to offer the novice photographer. On tight budgets the 1200D is simply the most affordable option, and capable of good image quality despite its ageing processor. However, the 100D isn't much more expensive, and it delivers much better image quality, and has a newer and faster AF system; its small size and light

weight also make it a good travelling companion.

The 700D is good deal more expensive than the 100D, but it's worth it if you want the feel of a bigger camera. There are more direct-access buttons for changing key settings, and a vari-angle screen, and the 700D has a more advanced AF system and a faster burst rate, making it a good choice for action photography.



## GET THE COMPLETE KIT

Pair your new DSLR with one of Canon's kit lenses – here are the options

Unless you're upgrading from an older Canon DSLR it's likely that you'll need a lens to complement your new camera body, and you'll usually save a considerable amount of money if you buy your camera complete with a 'kit' lens. Indeed, the quality of Canon's more recent kit lenses is so good that it's often worth buying a complete kit even if you have an older lens already.

The 1200D is often offered with the EF-S 18-55mm IS II lens. It's a decent optic, but we much prefer the newer EF-S 18-55 IS STM. The STM 'stepping motor' autofocus is virtually silent in operation, and enables smooth autofocus

transitions in video shooting (not relevant for the 1200D). The STM lens is a particularly good option for the 100D because, unlike the older IS II, the focus ring doesn't rotate during autofocus. This improves handling in the small 100D, as well as the other cameras in the group, as it doesn't matter if the focus ring rests on the fingers of your left hand while you're shooting.

There are two popular kit lens options for the 700D and 750D. As well as the EF-S 18-55 IS STM you can go for the EF-S 18-135mm IS STM. It's bigger and heavier, but offers much greater telephoto reach and very good image quality.





# The Ultimate Canon Collection

**684** PAGES + **3** PACKED VIDEO DISCS



Master your Canon SLR today with  
the full collection from only **£35**

[http://bit.ly/ultimate\\_bundle](http://bit.ly/ultimate_bundle)



[myfavouritemagazines.co.uk/photo](http://myfavouritemagazines.co.uk/photo)



## THE CONTENDERS



**Canon**  
EF-S 10-18mm  
f/4.5-5.6 IS STM  
£190/\$250



**Canon**  
EF-S 10-22mm  
f/3.5-4.5 USM  
£410/\$600



**Canon**  
EF 16-35mm  
f/2.8L II USM  
£1110/\$1600



**Canon**  
EF 16-35mm  
f/4L IS USM  
£735/\$1100



# WIDE-ANGLE ZOOMS

*See more with a wide zoom. We put the latest and greatest to the test*

For most DSLR shooters, the standard zoom lens supplied with a camera will be added to by a telephoto zoom and a wide-angle zoom, in that order. This trio of lenses caters to the vast majority of shooting needs, but wide-angle zooms arguably give the greatest wow factor. With exaggerated viewing angles, usually of about 108 degrees measured on the diagonal across the image frame, you're in for a big surprise when you first put your eye to the viewfinder. Compared with using a standard zoom lens at its shortest focal length, it's amazing how much more you can squeeze into the frame.

All of the lenses in this Super Test are 'rectilinear' optics rather than 'curvilinear' (fisheye) lenses. As such, they aim to keep distortions to a minimum and reproduce scenes with a natural look. That said, one of the joys of using a wide-angle lens is that you can really exaggerate perspective by getting in close to a subject and shooting it against a rapidly receding background.



			
<b>Sigma</b> 8-16mm f/4.5-5.6 DC HSM	<b>Sigma</b> 10-20mm f/3.5 EX DC HSM	<b>Sigma</b> 12-24mm f/4.5- 5.6 II DG HSM	<b>Tamron</b> 15-30mm f/2.8 Di VC USD
£550/\$700	£400/\$650	£600/\$950	£950/\$1200

## GEARTEST

# CANON EF-S 10-18mm f/4.5-5.6 IS STM

Small, lightweight and easy to live with, this new lens is a logical extension to your standard 'kit' zoom

£190/\$250

**W**e've seen a growing number of Canon lenses recently that feature a compact, lightweight design and the recently introduced STM (stepping motor) autofocus system, including the 18-55mm and 18-135mm 'kit' zoom lenses supplied with APS-C format bodies like the 750D. The lightweight theme stretches to the mounting plate, which is made from plastic rather than metal, as with the 18-55mm kit zoom.

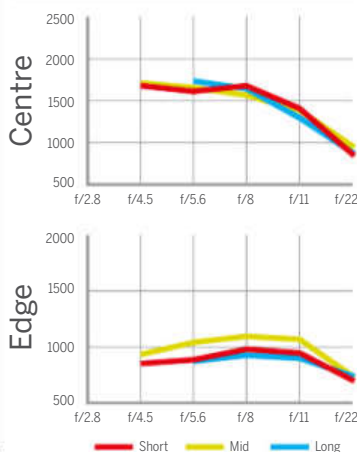
Typical STM highlights include silent and fairly rapid autofocus, along with smooth autofocus transitions when shooting video, plus full-time manual override. The 'fly by wire' focus ring is very thin, which isn't great for handling, but it's very smooth and precise in operation. The 10-18mm zoom range makes sense, as it gives a wide angle of view at the short end, and matches the 18mm starting point of standard kit zooms at the long end. Another bonus is that this is the only APS-C

format lens in the group to feature image stabilization, which gives a benefit of four f-stops, and is worth having.

## Performance

There are good levels of sharpness throughout the zoom and aperture ranges and the lens outperforms Canon's 10-22mm at some settings, despite costing half the price. Distortion at the short end of the zoom range isn't quite so well controlled but is still low.

## SHARPNESS



## FEATURES

- 01** There's no rotation or extension of the front element during focusing.
- 02** Canon's optional EW-73C petal-shaped hood is a wise investment.
- 03** The manual focus ring operates smoothly but is uncomfortably thin.
- 04** Performance of the image stabilizer lives up to its four-stop claim.
- 05** The lightweight mounting plate is plastic, not metal.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## HOW WE TEST

We combine real-world shooting results with rigorous lab testing to arrive at our overall ratings



**T**o test real-world performance, we use lenses in all sorts of lighting conditions, both indoors and outdoors. We check for good build quality and handling, smooth and precise operation of all controls, and we test the speed and accuracy of autofocus. We typically test full-frame-compatible lenses on a range of full-frame and APS-C format bodies, whereas lenses that are designed specifically for APS-C format bodies are only tested on cameras like the 70D and 7D Mark II. In-camera corrections for chromatic aberrations and peripheral illumination (where available) are disabled throughout all testing, to better reveal the true performance of each lens. We run a full range of lab tests under controlled conditions, using the Imatest Master and DxO Analyser suites. Photos of test charts are taken across the range of apertures and zoom settings, then analysed for sharpness, distortion and chromatic aberrations.



# CANON EF-S 10-22mm f/3.5-4.5 USM

Until recently, this was the only wide zoom lens for APS-C format DSLRs that Canon had ever made

£410/\$600

**W**hereas the Canon 10-18mm lens was launched in 2014, this one dates back a further ten years. It's therefore a comparative veteran and, until last year, had been the only official Canon wide zoom lens for DSLRs with APS-C format image sensors. It's a physically bigger lens than the 10-18mm and more than 50 per cent heavier at 385g. Even so, it's relatively small compared with its full-frame-compatible counterparts, like the Canon 16-35mm lenses on test.

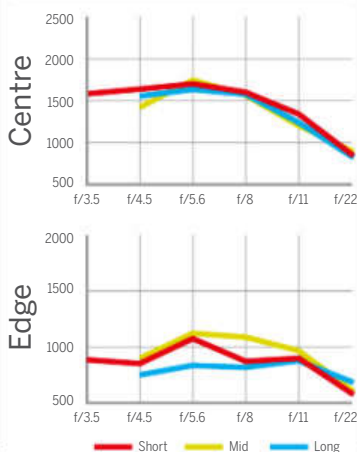
The ring-type ultrasonic autofocus system is extremely quick and only a little louder than the practically silent STM system of the 10-18mm lens. Naturally, the 10-22mm has a bigger zoom range but the maximum angle of view remains the same at 107.5 degrees (measured on the diagonal of the image frame). You get a little more reach at the long end and, taking the 1.6x APS-C crop factor into account, the zoom range is

equivalent to a 16-35mm lens on a full-frame body.

## Performance

There's not much to choose between this lens and the Canon 10-18mm for centre-sharpness at most zoom or aperture settings, although edge-sharpness can be a little disappointing. Distortions are particularly well controlled but colour fringing can be quite noticeable at the short end of the zoom range.

## SHARPNESS



## FEATURES

- 01** Compared with the 10-18mm lens, this one has a bigger 77mm filter thread.
- 02** You have to pay extra for the EW-83E lens hood.
- 03** The positions of the zoom and focus rings are reversed, compared with other Canon lenses tested.
- 04** The lens has a focus distance scale, unlike the 10-18mm.
- 05** With only six diaphragm blades, the aperture isn't very well rounded.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

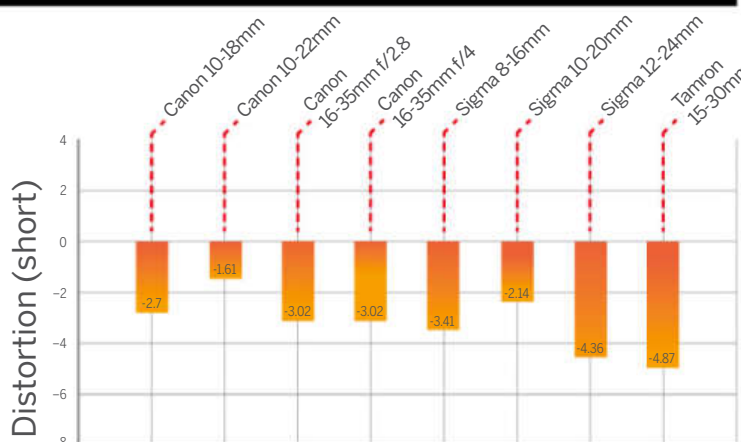
### OVERALL

★★★★★

## DISTORTION

You can expect some bowed distortion at the short end

**W**ide-angle zoom lenses are somewhat notorious for barrel distortion when used at or near their shortest focal lengths. The lenses on test fall into two distinct camps, being designed either for use with APS-C format or full-frame cameras. Of the APS-C format lenses, the Canon 10-22mm gives the least barrel distortion, whereas the Sigma 8-16mm gives the most. That's not surprising, given the Sigma's extraordinarily wide maximum viewing angle. In the full-frame contest, the two Canon 16-35mm lenses give the least barrel distortion, and the Tamron 15-30mm scores worst, although it does give a slightly wider maximum viewing angle than the Canon lenses.



Negative results of higher values indicate greater barrel distortion

## GEARTEST

# CANON EF 16-35mm f/2.8L II USM

This pro-grade lens has the joint widest aperture in the group, along with the new Tamron 15-30mm  
**£1110/\$1600**

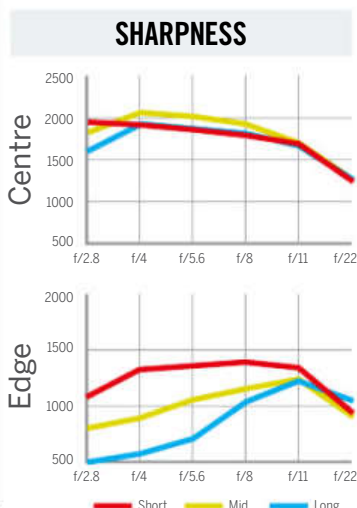
**F**or a full-frame wide-angle lens with a fast aperture of f/2.8 that remains constant throughout the zoom range, the Canon is reasonably compact at 89x112mm and not overly heavy at 640g. It's certainly smaller and lighter than the competing Tamron 15-30mm lens and, while its filter thread is quite large at 82mm, that's no bigger than in the APS-C format Sigma 10-20mm f/3.5.

Like many L-series (Luxury) lenses in Canon's lineup, the 16-35mm f/2.8 is robust and features weather-seals. Its ring-type ultrasonic autofocus is fast and quiet, and the zoom and focus rings are silky-smooth in operation. The physical length of the lens remains fixed throughout the zoom and focus ranges, although the inner barrel nears the end of the outer shell at either end of the zoom range, especially as you approach the shortest focal length. Unlike the Canon 16-35mm f/4 and Tamron

15-30mm f/2.8 lenses, there's no image stabilization.

## Performance

Throughout the zoom range, outright sharpness isn't quite as excellent as from the competing Canon and Tamron full-frame lenses on test, especially towards the edges of the frame. Colour fringing is also higher than average at short focal lengths, although it settles down at mid to long zoom settings.



## FEATURES

- 01** Unlike the Sigma and Tamron full-frame lenses, there's an attachment thread for filters.
- 02** The front element is more recessed at mid-range zoom settings.
- 03** Wide and comfortable, the focus ring operates very smoothly.
- 04** The metal mounting plate has a rubber weather-seal ring.
- 05** Aperture control is based on seven diaphragm blades.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## THE RIGHT STUFF

You can't beat using the right tools for the job, to get the best results

**T**he crop factor of APS-C format cameras extends the 'effective' focal length, which is great when you want to enhance the reach of telephoto lenses. But for wide-angle shooting it's counterproductive as it narrows the angle of view; if you were to fit a Canon 16-35mm to an APS-C camera, you'd only get a slightly wider angle of view than an 18-55mm kit lens.

Taking the 1.6x crop factor into account, 8-16mm and 10-22mm zoom lenses that are specifically engineered for APS-C cameras give almost identical ranges of viewing angles to 12-24mm and 16-35mm lenses on a full-frame camera. These images show just how much you lose in maximum viewing angle when using a wide-angle full-frame lens on an APS-C camera.



**8mm APS-C/12mm full-frame**



# CANON EF 16-35mm f/4L IS USM

It's a stop slower than Canon's f/2.8 lens but maintains L-series build quality and adds IS

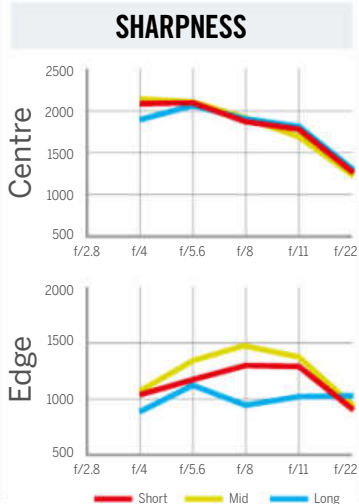
£735/\$1100

**W**hereas the redesigned and improved Mark II edition of the Canon 16-35mm f/2.8 lens was launched back in 2007, this f/4 lens is barely a year old. Despite being a stop slower, there's not much difference in size or weight. At 83x113mm and 615g, the f/4 lens is 6mm narrower, a millimetre longer, and just 25g lighter. However, the filter attachment thread is a little smaller at 77mm instead of 82mm.

Similarities in design include internal focus and zoom mechanisms, in which the inner lens barrel nears the forward edge of the outer barrel at either end of the zoom range. Again, it's a weather-sealed design and features professional-grade build quality. Handling is every bit as good as in the more expensive f/2.8 lens, and what this lens loses in the 'speed' of its widest aperture, it makes up for with the addition of a four-stop image stabilizer.

## Performance

Centre-sharpness is fabulous throughout the zoom range, even at the widest f/4 aperture. Sharpness is also well maintained away from the centre but it falls off towards the edges marginally more than in the Tamron 15-30mm lens. There's very little colour fringing and overall performance is excellent, making this lens better value than the Canon 16-35mm f/2.8.



## FEATURES

- 01** The filter thread has a popular and convenient size of 77mm.
- 02** As with the 16-35mm f/2.8 lens, a bayonet-mounting hood is included.
- 03** The focus ring is wider than in the 16-35mm f/2.8 lens.
- 04** Weather seals enable shooting in wet weather.
- 05** There are nine diaphragm blades compared with seven in the 16-35mm f/2.8.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★



12mm APS-C



10mm APS-C/16mm full-frame



16mm APS-C

## GEARTEST

# SIGMA 8-16mm f/4.5-5.6 DC HSM

This lens delivers the widest available viewing angle for APS-C format cameras, unless you go fisheye

£550/\$700

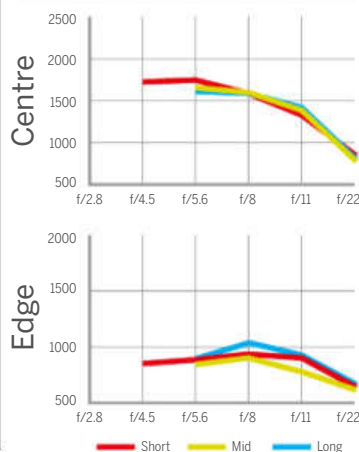
Just a couple of millimetres in focal length might not sound like it would make a big difference but, in this case, it really does. Pop the Sigma 8-16mm lens on an APS-C format camera instead of a competing lens that only goes down to 10mm, and the increase in viewing angle is huge. In fact, it's the same difference as zooming out from 16mm to 12mm on a full-frame camera, as demonstrated at the bottom of the previous page.

Measuring 75x106mm, this lens is physically longer than any of the other APS-C format lenses on test, but that's mostly because it comes with a built-in lens hood to protect the very bulbous, protruding front element. A downside of this, as with the equivalent Sigma 12-24mm lens for full-frame cameras, is that you can't use screw-in filters. That said, the two-part lens cap enables 72mm filters to be used when at the long end of the zoom range.

## Performance

Considering the enormous viewing angle enabled at its 8mm focal length, barrel distortion is quite well restrained, and there's only a slight hint of pincushion distortion at mid to long zoom settings. Sharpness is good rather than great, but images look well detailed even towards the edges. Colour fringing is also quite well controlled, especially at short focal lengths.

## SHARPNESS



## FEATURES

- 01 The built-in lens hood helps protect the protruding front element.
- 02 72mm filters can be used at the long end of the zoom range.
- 03 Ring-type ultrasonic autofocus is fast, quiet and accurate.
- 04 Like other Sigma and Tamron lenses, the zoom ring's direction is reversed compared to Canon.
- 05 There are no weather-seals but overall construction is of high quality.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## GOING STRAIGHT

How a wide-angle zoom lens can be a surprising ally when you're trying to avoid distortion

For architectural shots with straight lines near the edges of the frame, distortions can be painfully obvious. A neat trick is to use a wide-angle zoom near the long end of its zoom range, where distortions are

negligible. Alternatively, in the transition between barrel and pincushion through the zoom range, there's a crossover point where there's very little distortion, and certainly less than when a standard zoom is at its shortest focal length.

BAD: CANON 18-55mm (18mm)



GOOD: SIGMA 10-20mm (18mm)





# SIGMA 10-20mm f/3.5 EX DC HSM

It's the only APS-C format lens in the group with a constant-aperture, at f/3.5 through the zoom range

£400/\$650

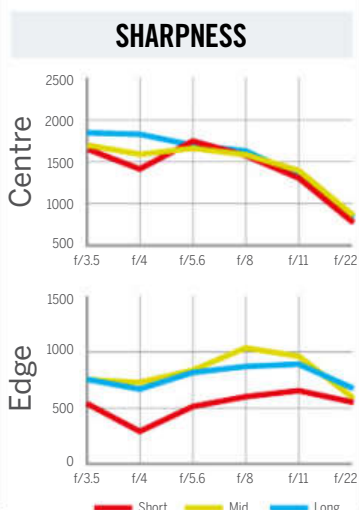
**S**igma was one of the first independent lens manufacturers to come to the market with a wide-angle zoom lens for APS-C format DSLRs. It was the 10-20mm f/4-5.6 EX DC HSM and, while that lens is still available today, it's outclassed by the newer f/3.5 constant-aperture lens, which was launched back in 2009.

The Sigma's 10-20mm zoom range equals that of the two Canon APS-C format lenses on test at the short end, and falls at the mid-point between them at the long end. The widest available aperture of f/3.5 is the same as the Canon 10-22mm at the latter's shortest focal length, but two-thirds of a stop faster at the long end. Compared with the Canon 10-18mm, the Sigma rises from two-thirds to 1.33 f-stops faster. Like other Sigma lenses on test, build quality feels good and there's fast, quiet ring-type ultrasonic autofocus. Unlike the other two Sigma lenses, the bayonet-mount hood is detachable and

filters can be used throughout the entire zoom range.

## Performance

Overall image quality is very good with impressive sharpness, while distortion and colour fringing are well controlled. But while centre-sharpness is generally as good or better than with either of the Canon APS-C format lenses on test, edge-sharpness falls away a little more at the short end of the zoom range.



## FEATURES

- 01** An 82mm filter thread enables easy fitment of filters.
- 02** The front section of the lens extends slightly at either end of the zoom range.
- 03** A focus distance scale is beneath a viewing panel.
- 04** High-grade plastics are used in the construction, along with a metal mounting plate.
- 05** The aperture is based on a seven-blade diaphragm.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

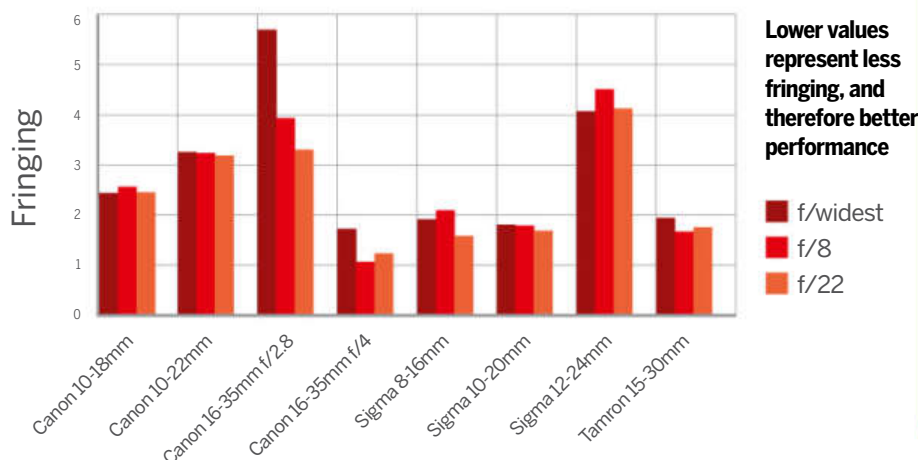
### OVERALL

★★★★★

## COLOUR FRINGING

It's most noticeable towards the edges...

**D**espite Canon's claim that 'two UD (Ultra Low Dispersion) elements virtually eliminate chromatic aberrations' in the 16-35mm f/2.8 lens, it nevertheless exhibits the joint worst colour fringing of any lens in the group at its shortest zoom setting, along with the Sigma 12-24mm. It remains a bit on the high side at mid-zoom settings, whereas the Canon 10-18mm performs worse than the competition at the long end of the zoom range.



# GEARTEST

## SIGMA 12-24mm f/4.5-5.6 II DG HSM

This ultra-wide full-frame lens doesn't have quite the same claim to fame as the Sigma 8-16mm

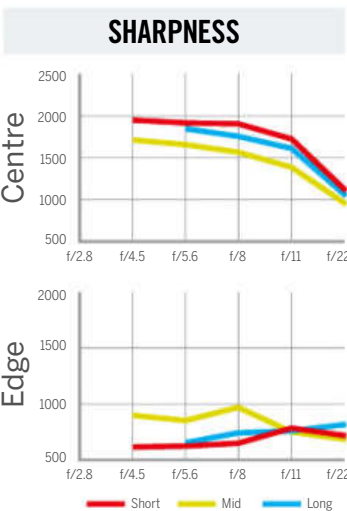
£600/\$950

Whereas the Sigma 8-16mm offers the widest viewing angle of any rectilinear lens for Canon APS-C-format DSLRs, the 12-24mm is overtaken by Canon's own 11-24mm for full-frame cameras (see bottom right). However, the Sigma's almost as wide and costs a fraction of the price of Canon's EF lens, so it's an attractive budget buy. In fact, it's the least expensive of any full-frame compatible lens on test, while beating them for maximum viewing angle.

The design and build are very similar to the Sigma 8-16mm lens, but physically sized up for full-frame use. The front element and built-in lens hood have a noticeably greater diameter, and the two-part lens cap enables use of 82mm rather than 72mm filters. Again though, you can only use the slip-over barrel section of the cap to fit filters at the long end of the zoom range, otherwise you'll suffer extreme vignetting.

### Performance

At the short end of the zoom range, centre-sharpness is on a par with the two Canon 16-35mm lenses, although it falls away more towards the edges. At mid to long zoom settings, sharpness across the whole frame is a little less impressive. Colour fringing is also a little high at the shortest focal length, but distortions are well controlled, given the availability of such extreme viewing angles.



### FEATURES

- 01 Like with the Sigma 8-16mm and Tamron 15-30mm lenses, the hood is integral.
- 02 The two-part lens cap accepts filters.
- 03 The zoom ring, focus ring and distance scale are almost identical to those of the Sigma 8-16mm.
- 04 Ring-type ultrasonic autofocus has the usual full-time manual override.
- 05 Unlike other Sigma lenses, there are six diaphragm blades rather than seven.

### VERDICT

**FEATURES**  
★★★★★

**BUILD & HANDLING**  
★★★★★

**IMAGE QUALITY**  
★★★★★

**VALUE**  
★★★★★

**OVERALL**  
★★★★★

## ANYONE FOR TOKINA?

Tokina makes several wide zooms, but you may have trouble finding them

Tokina manufactures a number of wide-angle zoom lenses that typically combine strong build quality with good optical performance. Current models include the 11-16mm f/2.8 AT-X PRO DX II and 12-28mm f/4 AT-X Pro DX for APS-C format cameras, and the 16-28mm f/2.8 AT-X PRO FX and 17-35mm f/4 AT-X PRO FX for full-frame bodies. There's also a

somewhat unique 10-17mm f/3.5-4.5 AT-X DX fisheye zoom for APS-C cameras that enables full-size rectangular (rather than circular) fisheye images throughout its zoom range. However, there's no official UK distributor for Tokina lenses and, even when there was previously, UK pricing represented poor value compared with buying the same lenses in the USA.



The Tokina 11-16mm has always been a popular wide-angle zoom but currently lacks a UK distributor



# TAMRON 15-30mm f/2.8 DI VC USD

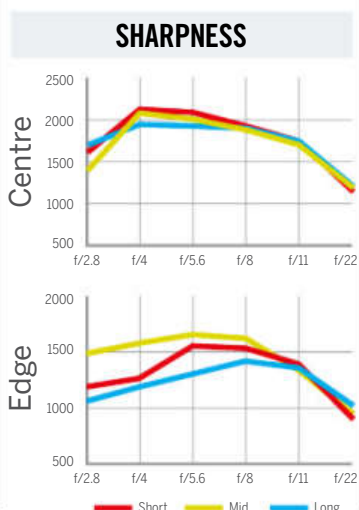
If you thought Tamron only made 'budget' lenses, this high-tech, high-quality lens will make you think again  
**£950/\$1200**

**T**amron has developed a line of 'fast' zoom lenses that have a constant, wide f/2.8 aperture, complete with optical image stabilization or VC (Vibration Compensation). We've been impressed by the quality of the SP 24-70mm f/2.8 Di VC USD standard zoom, and the SP 70-200mm f/2.8 Di VC USD is excellent value for money. The new 15-30mm takes the lineup into wide-angle territory, continuing the themes of impressive build quality, weather-sealed design, ring-type ultrasonic autofocus and image stabilization.

The Tamron's maximum viewing angle is a little wider than that of the two Canon full-frame lenses on test, at 110.5 degrees instead of 108 degrees. Physically, it's considerably bigger and heavier at 98x145mm and 1100g. Even so, it feels well balanced on bodies from the 6D to the 1D X and handling is excellent. However, the integral lens hood prohibits easy attachment of filters.

## Performance

Sharpness is exemplary from the centre to the extreme edges of images, throughout the zoom range. Colour fringing at the shortest focal length is better controlled than in Canon's competing 16-35mm f/2.8 lens, which also lacks an image stabilizer. The VC gave a four-stop benefit in our tests, equalling the stabilization performance of the Canon 10-18mm and 16-35mm f/4 lenses.



## FEATURES

- 01** Tamron's advanced coatings combat ghosting and flare.
- 02** The front element has a fluorine coating to repel muck and moisture.
- 03** USD (Ultrasonic Silent Drive) autofocus is fast, quiet and accurate.
- 04** VC stabilization is a bonus, and rare on a 'fast' standard or wide zoom lens.
- 05** Weather seals include a rubber ring around the metal mounting plate.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

# MONEY NO OBJECT

Going ultra-wide can cost big bucks









**B**efore the Canon EF 11-24mm f/4L USM came out, the Sigma 12-24mm was the undisputed king of ultra-wide viewing angles for any Canon-compatible rectilinear full-frame lens. However, while the Sigma gives a really wide maximum viewing angle of 122 degrees, the Canon beats it at 126 degrees. The Canon lens boasts fully professional-grade build quality with

weather seals, a constant f/4 widest aperture throughout the zoom range, and excellent optical performance. Control of distortion, even at the shortest focal length of 11mm, is particularly impressive. However, whereas the Sigma 12-24mm is a relatively affordable £600/\$950, the Canon lens is a real wallet-whacker at £2800/\$3000.



At £2800/\$3000, UK pricing of Canon's 11-24mm gets lost in translation compared with its cost in US dollars

## COMPARISON TABLE

	CANON EF-S 10-18mm f/4.5-5.6 IS STM	CANON EF-S 10-22mm f/3.5-4.5 USM	CANON EF 16-35mm f/2.8L II USM	CANON EF 16-35mm f/4L IS USM	SIGMA 8-16mm f/4.5-5.6 DC HSM	SIGMA 10-20mm f/3.5 EX DC HSM	SIGMA 12-24mm f/4.5-5.6 II DG HSM	TAMRON SP 15-30mm f/2.8 DI VC USD
								
WEB	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.sigma-imaging-uk.com">www.sigma-imaging-uk.com</a>	<a href="http://www.sigma-imaging-uk.com">www.sigma-imaging-uk.com</a>	<a href="http://www.sigma-imaging-uk.com">www.sigma-imaging-uk.com</a>	<a href="http://www.tamron.co.uk">www.tamron.co.uk</a>
FULL-FRAME COMPATIBLE	No	No	Yes	Yes	No	No	Yes	Yes
EFFECTIVE FOCAL LENGTH (APS-C)	16-28.8mm	16-35mm	25.6-56mm	25.6-56mm	12.8-25.6mm	16-32mm	19.2-38.4mm	24-48mm
IMAGE STABILIZER	Yes	No	No	Yes	No	No	No	Yes
MAX ANGLE OF VIEW (DIAGONAL)	107.5 degrees (APS-C)	107.5 degrees (APS-C)	108 degrees (full-frame)	108 degrees (full-frame)	121 degrees (APS-C)	109 degrees (APS-C)	122 (full-frame)	110.5 degrees (full-frame)
MIN APERTURE	f/22-29	f/22-27	f/22	f/22	f/22	f/22	f/22	f/22
ELEMENTS/GROUPS	14/11	13/10	16/12	16/12	15/11	13/10	17/13	18/13
DIAPHRAGM BLADES	7 blades	6 blades	7 blades	9 blades	7 blades	7 blades	6 blades	9 blades
MIN FOCUS DISTANCE	0.22m	0.24m	0.28m	0.28m	0.24m	0.24m	0.28m	0.28m
MAX MAG FACTOR	0.15x	0.17x	0.22x	0.23x	0.13x	0.15x	0.16x	0.20x
AF ACTUATOR	Stepping motor	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)
AF MAN OVERRIDE	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time
FOCUS DISTANCE SCALE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FILTER SIZE	67mm	77mm	82mm	77mm	N/A	82mm	N/A	N/A
HOOD	EW-73C (option)	EW-83E (option)	Included	Included	Build-in	Included	Built-in	Built-in
DIMENSIONS	75x72mm	84x90mm	89x112mm	83x113mm	75x106mm	87x88mm	87x120mm	98x145mm
WEIGHT	240g	385g	640g	615g	555g	520g	670g	1100g
TARGET PRICE	£190/\$250	£410/\$600	£1110/\$1600	£735/\$1100	£550/\$700	£400/\$650	£600/\$950	£950/\$1200
FEATURES	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
BUILD & HANDLING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
IMAGE QUALITY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
VALUE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

## THE WINNER IS... TAMRON SP 15-30mm f/2.8 DI VC USD

Bigger really is better, when it comes to Tamron's new wide-angle zoom

**T**he hefty Tamron 15-30mm delivers the outright best image quality of any lens in the group. The combination of constant f/2.8 aperture, excellent handling, weather-resistant build and effective image stabilizer make it the top choice for owners of full-frame cameras. If you're determined to stick with an own-brand Canon lens, the EF 16-35mm f/4L IS

USM is a smarter choice than the non-stabilized f/2.8 lens.

For crop bodies, the two best options are Sigma's 8-16mm or 10-20mm lenses. The 8-16mm gives the most exaggerated angle of view, whereas the 10-20mm gives sharper image quality across the whole frame. For a top-value addition to your 'kit' lens, look no further than Canon's new 10-18mm.





# Everything the Canon photographer needs!



A comprehensive reference guide  
to your Canon EOS digital SLR





## THE CONTENDERS

							
Canon EF 50mm f/1.8 II £90/\$125	Canon EF 50mm f/1.8 STM £125/\$125	Canon EF 50mm f/1.4 USM £245/\$330	Canon EF 50mm f/1.2L USM £1000/\$1450	Canon EF 85mm f/1.8 USM £250/\$350	Canon EF 85mm f/1.2L II USM £1500/\$2000	Sigma 50mm f/1.4 DG HSM A £700/\$950	Sigma 85mm f/1.4 EX DG HSM £650/\$970



# PORTRAIT PRIMES

*If ever there was a reason to ditch your standard zoom in favour of a prime optic, it's portraiture. We put eight choice prime lenses to the test*

**M**ost standard zoom lenses have a variable aperture design, with a widest available aperture that shrinks to around  $f/5.6$  at a focal length of 50mm. That's sufficient for general photography but it's not really wide enough to enable tight depth of field for blurring the background in portraiture. One solution is to spend big bucks on a 'fast' standard zoom but, even then, you're still likely to be limited to a widest available aperture of  $f/2.8$ . Another option is to use a telephoto zoom which can reduce the depth of field at longer focal lengths, but this tends to put too much distance between you and the person you're photographing.

For classic head-and-shoulders or half-length portraiture, a focal length of around 50mm is ideal for APS-C format cameras, such as the 750D, 70D and 7D. If you're using a full-frame camera, like the 5D, an 85mm focal length is a better fit. In both cases, a fast prime lens comes into its own. You can expect tight depth of field, thanks to a wide available aperture of at least  $f/1.8$ , even on the most inexpensive lens. As you go up the price scale,  $f/1.4$  lenses offer a further increase of two-thirds of an f-stop, while  $f/1.2$  lenses are a full f-stop wider than an  $f/1.8$  lens. Let's see how the main contenders compare in practice.



## GEARTEST

# CANON EF 50mm f/1.8 II

£90/\$125

It's been a popular budget buy but is now outclassed by Canon's new STM 'nifty fifty' in a few key areas

**T**he rock-bottom price is attractive but this lens has a very basic design, with no distance scale and a tiny manual focus ring at its front end that looks like an afterthought. There's also a plasticky feel and, indeed, it's the only lens in the whole group to feature a plastic, rather than metal, mounting plate. On the plus side, it's the most lightweight lens on test at just 130g, and it's very compact at 68x41mm, with a 52mm filter thread.

There are only five diaphragm blades, whereas all the other lenses in the group have between seven and nine. This can affect the bokeh (quality of defocused areas) when stopping down a little from the widest available aperture. It's also the only lens on test to feature a basic and somewhat old-fashioned electric motor to drive its autofocus. It's reasonably quick but quite noisy. The inner barrel extends at shorter focusing distances but, as with all other lenses in the group, it

doesn't rotate. The front element remains deeply recessed throughout the focus range, making the purchase of the optional lens hood non-essential.

## Performance

Sharpness and contrast are good when shooting wide open but don't improve much when stopping down to f/2.8. Back at f/1.8, bokeh is quite smooth but defocused areas can lack smoothness when stopping down a little. Colour fringing (lateral chromatic aberrations) is minimal but bokeh fringing is a bit more noticeable than usual.



## FEATURES

- 01** All Canon lenses on test have Super Spectra coatings to help combat ghosting and flare.
- 02** The front element is quite deeply recessed within the inner barrel.
- 03** The manual focus ring at the front end of the lens is tiny.
- 04** No focus distance scale is featured on the lens barrel.
- 05** It's the only lens on test with a plastic, rather than metal, mounting plate.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## HOW WE TEST

We combine real-world shooting results with rigorous lab testing to arrive at our overall



**T**o test real-world performance, we use lenses in all sorts of lighting conditions, both indoors and outdoors. We check for good build quality and handling, smooth and precise operation of all controls, and we test the speed and accuracy of autofocus. We typically test full-frame-compatible lenses on a range of full-frame and APS-C format EOS bodies, and test APS-C lenses on cameras like the 70D and 7D Mark II. We run a full range of lab tests under controlled conditions, using Imatest Master and DxO Analyser suites. Photos of test charts are taken across the range of apertures, then analysed for sharpness, distortion and chromatic aberrations (colour fringing).



# PORTRAIT PRIME LENSES

## CANON EF 50mm f/1.8 STM

£125/\$125

An updated version of the 50mm f/1.8 II, this boasts better specifications and a thoroughly modern design

There's little to choose between this new STM lens and the older 50mm f/1.8 II in terms of size and weight, but the newer lens includes some significant upgrades. It feels more solid and better built, not least because it has a metal, instead of plastic, mounting plate. The number of diaphragm blades is increased from five to seven, enabling a more well-rounded aperture, and the minimum focus distance is reduced from 45cm to 35cm, although that's of little benefit for portraiture.

As an 'STM' lens, the autofocus system is based on a stepping motor instead of a more basic electric motor. We've been impressed with STM performance in terms of speed and virtually silent operation in zoom lenses like the EF-S 18-55 and EF-S 18-135mm. However, in this 50mm lens, the system is relatively sluggish and clearly audible. A bonus over the older 50mm f/1.8 II lens is that 'fly by wire' manual focusing is smoother and more

precise, and full-time manual focus override is available in One Shot autofocus mode.

### Performance

There's practically no difference in image quality between this lens and the 50mm f/1.8 II when shooting wide open. However, the STM lens's seven-blade diaphragm improves the smoothness of defocused areas in images when stopping down a little, and the lens proved sharper in our lab tests when shooting at f/2.8. Overall, the improvements are very welcome and make the new STM lens a steal at the price.



### FEATURES

- 01 Compared with the older 50mm f/1.8, the filter thread is downsized from 52mm to 49mm.
- 02 Like the older lens, the front element is deeply recessed.
- 03 The 'fly-by-wire' manual focus ring is smooth and precise.
- 04 Like other STM lenses, there's no focus distance scale.
- 05 A sturdy metal mounting plate adds robustness.

### VERDICT

#### FEATURES

★★★★★

#### BUILD & HANDLING

★★★★★

#### IMAGE QUALITY

★★★★★

#### VALUE

★★★★★

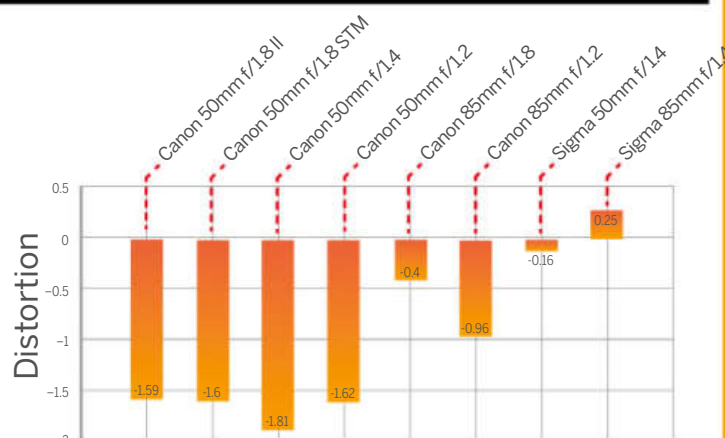
#### OVERALL

★★★★★

## DISTORTION

You can expect to see minimal distortion from standard and short telephoto prime lenses

Shrinkage of depth of field and faster shutter speeds aren't the only bonuses of these lenses. 50mm 'standard' and 85mm telephoto prime lenses typically deliver very little distortion. The improvement can be quite noticeable, compared with standard zooms that often give a pincushion effect at their mid to long zoom settings. Most of the lenses exhibit minor amounts of barrel distortion; it's most noticeable in the Canon 50mm lenses. The Sigma 50mm has the least distortion, whereas the Sigma 85mm is the only lens to produce slight pincushion.



Negative results of higher values indicate greater barrel distortion

# GEARTEST

## CANON EF 50mm f/1.4 USM £245/\$330

It's certainly an old lens but is it a classic? Let's see how well it fends off newer competitors

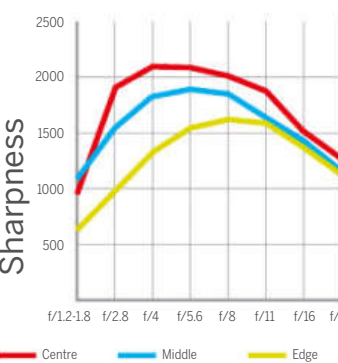
**L**aunched some 22 years ago, this veteran is a bit of a mixed bag in terms of specifications. It has a fairly straightforward layout of seven optical elements arranged in six groups, an eight-blade diaphragm and the same 45cm closest-focus distance as the other Canon 50mm lenses on test (apart from the new f/1.8 STM). Autofocus is ultrasonic but based on a motor rather than a ring-type system. It's not especially quiet but is faster than most ultrasonic motor systems we've encountered. More unusually, it boasts full-time manual override in One Shot autofocus, which isn't normally available with this type of autofocus.

The lens is about twice the price and twice the weight of the 50mm f/1.8 lenses. At f/1.4, its widest available aperture is two-thirds of a stop faster, and the front element and filter attachment thread are rather larger. Even so, the lens is very much smaller, lighter and less expensive than

the Canon 50mm f/1.2 lens, or the Sigma 50mm, which has the same f/1.4 aperture rating.

### Performance

Levels of sharpness are disappointing at f/1.4 but bokeh fringing is slightly less in evidence than with the two Canon 50mm f/1.8 lenses at their widest aperture. There's also a little more smoothness available in background blur using the wider f/1.4 aperture. Sharpness increases noticeably at f/2.8 and is excellent at f/4 to f/5.6. Apart from the lack of wide-open sharpness, performance is pleasing and the lens is good value.



### FEATURES

- 01 The inner barrel extends at shorter focus distances.
- 02 The front element and 58mm filter thread certainly aren't massive.
- 03 A focus distance scale is positioned beneath a viewing window.
- 04 The ultrasonic motor (non-ring-type) features full-time manual override.
- 05 The well-rounded aperture is based on an eight-blade diaphragm.

### VERDICT

FEATURES	★★★★☆
BUILD & HANDLING	★★★★☆
IMAGE QUALITY	★★★★☆
VALUE	★★★★☆
OVERALL	★★★★☆

## THE SHALLOW END

How much can you blur the background?

**T**his sequence of shots was taken with a 70D and 50mm f/1.2 lens. The distance from the camera to the main subject is about 1.5 metres, whereas the distance to the background is six metres. The relative minimum depths of field are therefore indicated for the f/1.2, f/1.4 and f/1.8 lenses on test, as well as for popular zoom lenses that have a widest available aperture of either f/2.8 and f/5.6 at around 50mm.



50mm f/1.2



50mm f/1.4



# PORTRAIT PRIME LENSES

## CANON EF 50mm f/1.2L USM £1000/\$1450

It's a fully professional-grade lens with a price to match, and the widest aperture of any 50mm lens

**C**omparatively big and hefty at 85x66mm and 545g, this 50mm lens is built like a tank. It's also the only lens tested to feature weather-seals. Like the other 50mm lenses we've covered so far, the inner barrel extends at shorter focusing distances but, as the outer barrel is longer, the lens doesn't change in overall physical length. The front element isn't so deeply recessed but it comes complete with a detachable hood.

To let in more light, equating to a full extra f-stop compared with f/1.8 lenses, the front element is considerably larger and the filter thread is upsized to 72mm. The ring-type ultrasonic autofocus system is fast and quiet, with the usual full-time manual override. Like Canon's 50mm f/1.4 lens, the aperture is based on eight diaphragm blades.

### Performance

This lens is renowned for giving a very 'dreamy' or 'creamy' softness to images

when used at or near its widest f/1.2 aperture. This can work well for portraiture, smoothing over blemishes in the skin. In the digital age, however, many feel that it's easy to apply softening at the editing images, rather than trying to add sharpness (in the eyes, for example) that isn't really there. Bokeh is impressively smooth and, at f/1.2, additional blurring of the background is just about noticeable compared with using a 50mm f/1.4 lens at its widest aperture. Bokeh fringing is well controlled but lateral chromatic aberrations are higher than average.



### FEATURES

- 01** The front element nears the end of the outer barrel.
- 02** At 72mm, the filter thread is actually smaller than the Sigma 50mm f/1.4.
- 03** The manual focus ring isn't particularly wide, as in the Canon 85mm f/1.2 lens.
- 04** The focus distance scale has depth of field markers for various apertures.
- 05** It's the only lens in the group with a rubber weather-seal ring on its mount.

### VERDICT

#### FEATURES

★★★★★

#### BUILD & HANDLING

★★★★★

#### IMAGE QUALITY

★★★★★

#### VALUE

★★★☆☆

#### OVERALL

★★★★★



50mm f/1.8



50mm f/2.8



50mm f/5.6

# CANON EF 85mm f/1.8 USM £250/\$350

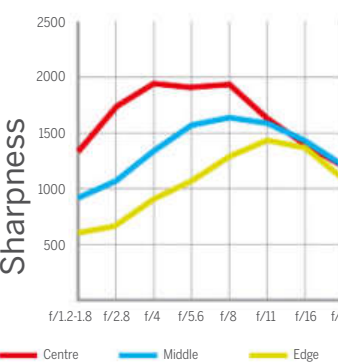
More back-catalogue than cutting edge, it's another Canon lens of 'a certain age'

Originally launched back in 1992, this lens is about the same age as the Canon 50mm f/1.4 that's also on test. The designs look very similar, although the 85mm lens has its focus distance scale window at the rear rather than the front. The manual focus ring is also wider, and the autofocus system is ring-type ultrasonic rather than relying on an ultrasonic motor. Autofocus speed is fast, helped by the fact that the mechanism moves mid-section elements within the lens, rather than larger forward ones. Another bonus of this is that focusing is fully internal, and the front element doesn't extend at shorter focus distances.

An upside of being a full f-stop slower than the Canon 85mm f/1.2 lens is that it's a lot smaller and lighter in weight. Indeed it weighs in at a modest 425g compared with the f/1.2 lens's 1025g, and it only costs about a sixth of the price. Like all the Canon lenses in the group, except the

50mm f/1.8 models, the aperture is based on eight diaphragm blades. The filter attachment thread is reasonably small, at 58mm.

**Performance**  
Sharpness is a little lacking at f/1.8 and lags behind most other lenses in the group between f/2.8 and f/5.6. Bokeh fringing and lateral chromatic aberrations are well restrained, and defocused areas in images are silky smooth. Barrel distortion is minimal and, overall, image quality is very good indeed. It's excellent value, especially for full-frame photographers.



**FEATURES**

01 The front element isn't very recessed, so the ET-65 III hood is worth buying.

02 At 58mm, the filter thread is relatively small for an 85mm lens.

03 The ring-type ultrasonic autofocus is fast and quiet.

04 The aperture is controlled via an eight-blade diaphragm.

05 Focusing is based on the movement of mid-section elements.

**VERDICT**

**FEATURES**  
★★★★☆

**BUILD & HANDLING**  
★★★★☆

**IMAGE QUALITY**  
★★★★☆

**VALUE**  
★★★★★

**OVERALL**  
★★★★★

## WHAT'S THE DEAL WITH BOKEH FRINGING?

It can be noticeable at wider apertures

The term 'colour fringing' is usually applied to lateral chromatic aberrations. However, lenses with wide apertures are also notorious for longitudinal chromatic aberrations, often referred to as 'bokeh fringing'. Here, different wavelengths of light are focused at different points along the axis of travel. Unlike lateral chromatic aberrations, bokeh fringing can't be easily corrected.



A magnified view of the top of the yellow flower in this wide-aperture shot reveals green bokeh fringing



# PORTRAIT PRIME LENSES

## CANON EF 85mm f/1.2L II USM

£1500/  
\$2000

A big bruiser of a lens, it aims to be the heavyweight champion of the group and has an XL price tag

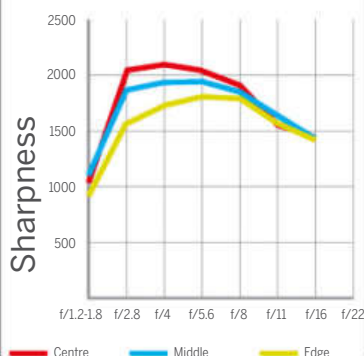
The only lens in this group to tip the scales at more than a kilogram, the Canon 85mm f/1.2 is weighty, solid and robust. At 92mm in diameter, it's physically the widest lens in the group, although the Sigma 50mm f/1.4 is 16mm longer. Both Sigma lenses also have a larger 77mm filter attachment thread, compared with this lens's 72mm. Like the Canon 50mm f/1.2 that's also on test, this lens boasts a class-leading maximum aperture width, and is from Canon's L-series stable. However, unlike many L-series lenses, including the 50mm, it lacks weather-seals.

An upgrade to the original edition of this lens, the Mark II claims faster autofocus. Even so, autofocus is the slowest of any lens in the group, despite being a ring-type ultrasonic system, as it needs to move the large and heavy front element forward and backward. A plus point for manual focusing is that the focus ring has a long travel, which helps to enable very fine adjustments, often

required by the availability of a tiny depth of field.

### Performance

There's a bit more sharpness at the widest available aperture than with Canon's 50mm f/1.2 lens, but images still tend to look pretty soft. The 85mm outperforms the 50mm for sharpness when stopped down a little to between f/1.4 and f/2.8. Bokeh fringing and lateral chromatic aberrations are more noticeable than from the Canon 85mm f/1.8 lens, while blurred backgrounds typically look only marginally smoother. Overall, it's a good lens but relatively poor value.



### FEATURES

- 01 The front element has an extra-large diameter for gathering light.
- 02 The inner barrel and front element extend at shorter focus distances.
- 03 The focus distance scale features depth of field markings.
- 04 Despite ring-type ultrasonic autofocus, AF speed is comparatively slow.
- 05 Unlike most L-series lenses, there's no weather-seal ring on the mounting plate.

### VERDICT

#### FEATURES

★★★★★

#### BUILD & HANDLING

★★★★★

#### IMAGE QUALITY

★★★★★

#### VALUE

★★★☆☆

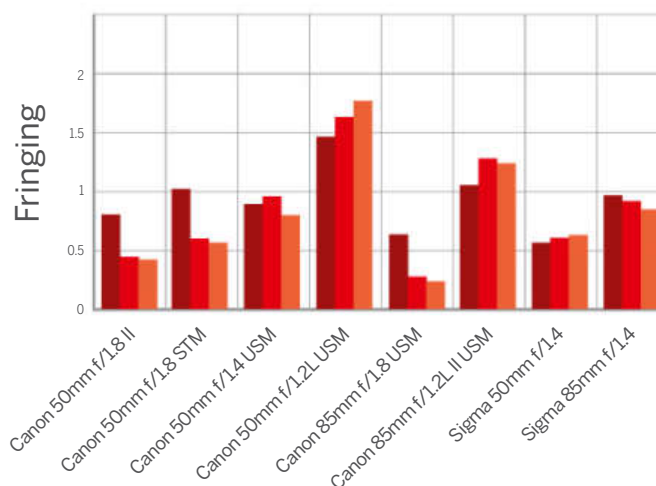
#### OVERALL

★★★★★

## COLOUR FRINGING

Chromatic aberration is worse in the corners

Unlike bokeh fringing, lateral chromatic aberrations tend to go unnoticed at the centre of the frame, and become worse towards the edges. Whereas bokeh fringing can be much reduced by narrowing the aperture, this isn't usually the case with lateral chromatic aberrations. Fringing is well restrained in all the lenses, although the Sigma 50mm and Canon 85mm f/1.8 are the most impressive. The pricey Canon 50mm f/1.2 and 85mm f/1.2 lenses come bottom of the group.



Lower values represent less fringing, and therefore better performance

■ f/2.8  
■ f/8  
■ f/16

## GEARTEST

# SIGMA 50mm f/1.4 DG HSM A

£700/\$950

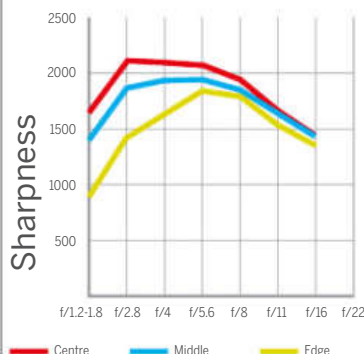
Bigger, better and beautifully put together, this newly launched Sigma 50mm lens sets a new standard

**T**he now obsolete Sigma 50mm f/1.4 EX DG HSM ticked most of the right boxes as a fast, standard prime but was criticized in some quarters for being large and heavy. However, the all-new 'Art' line lens is bigger still at 85x100mm and has gone up in weight from 520g to 815g. It also costs more than twice the price, but represents the finest optic that Sigma is capable of producing.

The relatively complex design is based on 13 elements in eight groups, including an aspherical element and three SLD (Special Low Dispersion) elements. A well-rounded aperture is enabled by a nine-blade diaphragm, and autofocus is driven by a ring-type ultrasonic system that's both fast and whisper-quiet, boosted by a mechanism in which the smaller back elements are moved, rather than the hefty front ones. Build quality feels on a par with the best Canon 50mm and 85mm L-series professional-grade lenses.

## Performance

The lens is super-sharp, even at its widest f/1.4 aperture, and far outclasses the Canon 50mm f/1.2 and f/1.4 lenses in the f/1.4 to f/2 aperture range. Meanwhile, bokeh is simply beautiful, with a wonderfully smooth and creamy look to defocused areas. Barrel distortion is only very slight and both bokeh fringing and lateral chromatic aberrations are minimal. Handling is a joy, despite the large size. This Sigma optic is an absolute cracker and performs better than Canon's finest 50mm f/1.2 lens, also at two-thirds of the price.



## FEATURES

- 01** The fixed front element remains stationary during focusing.
- 02** The action of the comfortably wide manual focus ring has a lovely fluid feel.
- 03** A focus distance scale sits beneath a viewing window.
- 04** Ring-type ultrasonic autofocus is fast and quiet, with full-time manual override.
- 05** An optional USB dock enables firmware updates and customization.

## VERDICT

**FEATURES**  
★★★★★

**BUILD & HANDLING**  
★★★★★

**IMAGE QUALITY**  
★★★★★

**VALUE**  
★★★★★

**OVERALL**  
★★★★★

## WELL-ROUNDED APERTURES

Is your bokeh shaping up nicely?

**T**he diaphragm blades that control aperture naturally have no effect when you're shooting 'wide open' at the lens's widest aperture. However, if you stop down a little, the roundness of the aperture can play a big part in the quality of the bokeh. Generally speaking, a larger number of curved diaphragm blades enables a more rounded aperture. This helps to avoid defocused lights and small highlight areas taking on pronounced and noticeable geometric shapes.

### FIVE-BLADE



### EIGHT-BLADE



Shot at f/5.6 on Canon 50mm f/1.8 II and 50mm f/1.4 lenses, these defocused fairy lights demonstrate the difference between a five-blade and eight-blade diaphragm respectively



# PORTRAIT PRIME LENSES

## SIGMA 85mm f/1.4 EX DG HSM

£650/\$970

This Sigma sits between Canon's cheaper 85mm f/1.8 and big-money 85mm f/1.2 lenses

**L**aunched about five years ago, this lens is from Sigma's 'EX' lineup, signifying professional-grade optics, and build quality feels reassuringly good.

The 85mm shares much of the design criteria of the Sigma 50mm Art lens, with a fairly complex arrangement of 11 elements in nine groups, a nine-blade diaphragm, ring-type ultrasonic autofocus and the use of SLD (Special Low Dispersion) glass. However, this time there's only one SLD element instead of three. Another similarity is that focusing relies on the movement of the relatively small, rear-mounted elements. Even so, autofocus is much slower than in the Sigma 50mm lens, and not a whole lot quicker than the sluggish system in the Canon 85mm f/1.2 lens. That's despite the Sigma having a relatively short-travel manual focus ring.

### Performance

The Sigma delivers better centre-sharpness than the

Canon 85mm f/1.2 lens when using wide apertures in the f/1.4 to f/2 range, but sharpness drops off more in the corners of the frame. Overall sharpness is also better than from the Canon 85mm f/1.8 lens. Bokeh fringing can be visible and is very similar to that of the Canon 85mm f/1.2, whereas lateral chromatic aberrations are a little better controlled. It's the only lens on test to exhibit slight pincushion rather than barrel distortion but, overall, image quality is very good and the lens is a better buy than the pricier Canon 85mm f/1.2.



### FEATURES

- 01** The 77mm filter attachment thread is the same size as that of the Sigma 50mm.
- 02** A lens hood is supplied, along with an extender for use with APS-C format cameras.
- 03** The focus ring doesn't feel as smooth as that of the Sigma 50mm.
- 04** Autofocus is sluggish for a ring-type ultrasonic system.
- 05** Like most Sigma lenses, there are no weather-seals.

### VERDICT

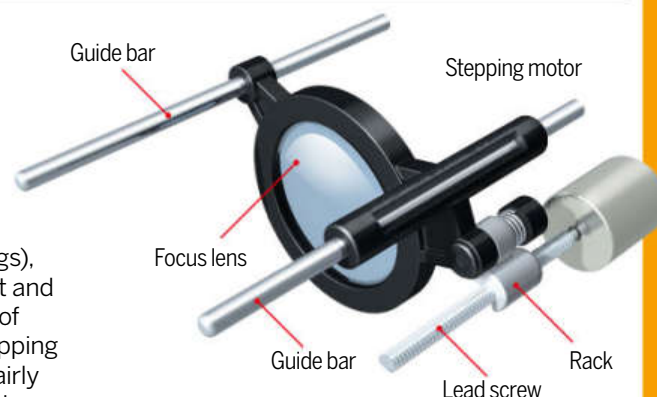
**FEATURES**  
★★★★★  
**BUILD & HANDLING**  
★★★★★  
**IMAGE QUALITY**  
★★★★★  
**VALUE**  
★★★★★  
**OVERALL**  
★★★★★

## AUTOFOCUS FINERY

Snappy focusing depends on the type of motor driving the AF system









**S**uper-fast autofocus isn't usually a prerequisite for portraiture but, if you're to capture action portraits, quick focusing can be a bonus. Similarly, whisper-quiet AF can be an advantage if you're shooting candid portraits. There are three main systems on offer. Basic 'micro motor' autofocus is the least refined and is typically slowest and

loudest. Ultrasonic autofocus can be motor-driven or ring-type (based on two large actuating rings), the latter usually being the fastest and quietest of the two. Finally, some of Canon's latest lenses feature 'stepping motor' autofocus, which can be fairly quick and virtually silent in operation. It's particularly good for movie capture, as it enables smooth focus transitions.



**Stepping motor autofocus can be fast for stills, smooth for movies, and is virtually silent in operation**

## COMPARISON TABLE

	Canon EF 50mm f/1.8 II	Canon EF 50mm f/1.8 STM	Canon EF 50mm f/1.4 USM	Canon EF 50mm f/1.2L USM	Canon EF 85mm f/1.8 USM	Canon EF 85mm f/1.2L II USM	Sigma 50mm f/1.4 DG HSM A	Sigma 85mm f/1.4 EX DG HSM
								
WEBSITE	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.sigma-imaging-uk.com	www.sigma-imaging-uk.com
FULL-FRAME COMPATIBLE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EFFECTIVE FOCAL LENGTH (APS-C)	80mm	80mm	80mm	80mm	136mm	136mm	80mm	136mm
MAX MAG FACTOR	0.15x	0.21x	0.15x	0.15x	0.13x	0.11x	0.18x	0.12x
ANGLE OF VIEW (DIAGONAL)	46 degrees	46 degrees	46 degrees	46 degrees	28 degrees	28 degrees	47 degrees	28 degrees
MIN FOCUS DISTANCE	45cm	35cm	45cm	45cm	85cm	95cm	40cm	85cm
FOCUS DISTANCE SCALE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
NARROWEST APERTURE	f/22	f/22	f/22	f/16	f/22	f/16	f/16	f/16
ELEMENTS/GROUPS	6 / 5	6 / 5	7 / 6	8 / 6	9 / 7	8 / 7	13 / 8	11 / 8
DIAPHRAGM BLADES	5 blades	7 blades	8 blades	8 blades	8 blades	8 blades	9 blades	9 blades
AUTOFOCUS	Micro motor	Stepping motor	Ultrasonic (motor)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)	Ultrasonic (ring)
INTERNAL FOCUSING	No	No	No	Yes	Yes	No	Yes	Yes
MANUAL AUTOFOCUS OVERRIDE	No	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time
FILTER SIZE	52mm	49mm	58mm	72mm	58mm	72mm	77mm	77mm
HOOD	Optional (ES-62)	Optional (ES-68)	Optional (ES-71 II)	Supplied (ES-78)	Optional (ET-65 III)	Supplied (ES-79 II)	Supplied	Supplied
DIMENSIONS (DIA X LENGTH)	68x41mm	69x39mm	74x51mm	85x66mm	75x72mm	92x84mm	85x100mm	86x88mm
WEIGHT	130g	160g	290g	545g	425g	1025g	815g	725g
TARGET PRICE	£90/\$125	£125/\$125	£245/\$330	£1000/\$1450	£250/\$350	£1500/\$2000	£700/\$950	£650/\$970
FEATURES	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
BUILD & HANDLING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
IMAGE QUALITY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
VALUE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

## THE WINNER IS... SIGMA 50mm f/1.4 DG HSM A

It's a spectacular 50mm prime lens with stunning image quality and sublime handling

**B**igger isn't always better but the unusually large Sigma 50mm f/1.4 Art lens delivers stunning image quality. This is especially true for sharpness at very wide apertures, where it resoundingly beats Canon's pricier f/1.2 lenses. It's similarly impressive in all other aspects of image quality, along with excellent build quality and great handling. It's the best choice for a premium portrait lens on APS-C format cameras. Even so, the 50mm

focal length can feel a little short for portraiture on a full-frame camera. In this case, Sigma wins again with its 85mm f/1.4 lens. It performs as well as the Canon 85mm f/1.2 lens but is only about half the price, making it much better value. For the best budget choices, we recommend the new Canon EF 50mm f/1.8 STM for portraiture on APS-C bodies (although it's also full-frame compatible), and the Canon EF 85mm f/1.8 USM for full-frame cameras.





# DISCOVER BRITAIN'S BEST-SELLING PHOTO MAG!

**164  
PAGES**  
OF EXPERT ADVICE



*Digital Camera* is the definitive guide to SLR photography. Every issue is packed with in-depth advice and practical tips for better photos. We also publish the toughest tests around, helping you buy cameras and lenses with confidence.

## FREE DISC EVERY ISSUE!

Plus a host of other great gifts – see your local newsagent today

Subscribe today at [www.bit.ly/digitalcameramagazine](http://www.bit.ly/digitalcameramagazine)

Also available on your tablet or phone!







## CANON EOS 5DS & EOS 5DS R

These 50Mp DSLRs aim to set new standards in photography, we put both to the test in real-world conditions

**C**anon's EOS 5D line of DSLRs has been an important one, bridging the gap between professional and amateur photography, giving enthusiasts a more affordable route to full-frame shooting, and pros a smaller, lighter camera to backup their fully professional-level model. It's also the line that kick-started the whole DSLR Full HD video thing, with many filmmakers choosing to use the 5D Mark II and then the 5D Mark III.

Now we have the 5DS and 5DS R, both of which have 50.6 million effective pixels on their full-frame sensor, making them the world's first 50-megapixel DSLR; a pixel count normally associated with £30K monster medium-format professional-level cameras.

Canon's EOS 5DS is the world's first 50-megapixel DSLR, making it a real medium-format slayer

Neither camera is set to replace the EOS 5D Mark III; rather they are designed to give a higher-resolution alternative to the more general-purpose older model. As the 5DS and 5DS R are identical, apart from a small but significant difference with the sensor (see S or SR? for details), unless otherwise stated,

we'll use 5DS in this review to refer to both it and the 5DS R.

### Specifications

Alongside the 50Mp sensor, the 5DS has two Digic 6 processing engines, instead of the single Digic 5+ processor of the 5D Mark III. This enables a native sensitivity range of ISO100-6400 with expansion settings taking this to ISO50-12,800. For comparison, the native range of the 5D Mark III is ISO100-12,800 and the expansion settings take the range to ISO50-102,400.

Despite all the processing power, the 5DS can 'only' manage a maximum continuous shooting speed of 5fps (for 510 Large Fine JPEGs or 14 Raw files with a UDMA



The 5DS/R captures natural colours, but you can customize the picture style to make images more vibrant



FULL TEST **5DS & 5DS R**

**// The world's first 50-megapixel DSLR has a pixel count normally associated with £30K medium-format cameras //**

such a high-resolution model.

Canon has used a more rigid resin for the body, for example, and the both the base plate and tripod mount have been strengthened to give a more solid platform.

In addition, the mirror movement is controlled by a cam mechanism to avoid the 'slap' that is typical of DSLRs and can lead to blur-inducing mirror-shake. It makes a noticeable difference to the sound and feel of the camera in use.

Externally, the only part that separates the 5DS and the 5D Mk III is the name badge on the front. The cameras have exactly the same shape and control layout. This means that you can slip seamlessly between the two if you want, perhaps using the 5D Mark III to shoot action, or video, and the 5DS for detail-rich subjects like landscape, still life and macro.

With a 24-70mm f/2.8 lens mounted you wouldn't describe the 5DS a lightweight, but the deep front grip and rear thumb ridge make it feel very secure and comfortable in your hand.

As usual with a high-end camera, the 5DS has a secondary LCD screen on the top-plate that displays key info. This is useful when shooting low-level or table-top subjects because, unlike on the Canon 760D and 750D, the main screen is fixed.

By default, the autofocus point is set with the AF Point Selection button, near the thumb rest on the back of the camera, and then using the joystick-like Multi-controller. However, we found it useful to use the Custom Controls settings to enable me to use the Multi-controller to set the AF point.

There are six AF Area Selection modes; Single-point Spot AF



CompactFlash card installed), rather than the 6fps for 16,270 Large Fine JPEGs or 18 Raw files of the 5D Mark III with the same card.

Other significant changes from the 5D Mark III include a 150,000-pixel RGB+IR metering sensor with 252 zones and Intelligent Scene Analysis in place of the iFCL device with 63 zones, a new M-Raw image size that records 28Mp images (as well as the 12.4Mp S-Raw option) and a USB 3.0 port instead of a USB 2.0 port for speedier image transfer. There's also an Intelligent Viewfinder II with AF point illumination in AI Servo mode instead of the original Intelligent Viewfinder in the 5D Mark III.

Other introductions include a new Fine Detail picture style to tailor the look of JPEGs, plus

a collection of Mirror Lockup options, a built-in intervalometer and the ability to shoot time-lapse movies that are merged in-camera.

### Build & handling

Outwardly the 5DS looks identical to the 5D Mark III, however there have been some changes to the build of the camera to reduce vibrations, which could have significant implications for

**We shot this scene on the 5DS R with a polarizer – the amount of detail and colour is very impressive**





## NO MIRROR LOCKUP



## MIRROR LOCKUP



(Manual Selection), Single-point AF (Manual Selection), AF Point Expansion (Manual Selection), AF Point Expansion (Manual Selection, Surrounding 8 Points), Zone AF (Manual Selection of Zone) and 61-point Automatic Selection AF. These are selected by pressing the AF Point Selection button on the back of the camera and then using the Multi-function (M-Fn) button near the shutter release to toggle through the options. This is straightforward and the AF points illuminate in the viewfinder to indicate which option is selected.

Like the 5D Mark III, there's also a dedicated autofocus section in the main menu. The first page of this has a collection of options to set the AI Servo (continuous autofocus) mode characteristics, varying aspects such as tracking sensitivity, acceleration/deceleration tracking and AF point switching.

Being a full-frame DSLR, the 5DS has a large optical viewfinder. This is bright and shows 100% of the scene so there are no nasty surprises around the edges of images. Like the 5D Mark III, it's possible to display an electronic level in the viewfinder, as well as on the main screen, but unlike the 5D Mark III, the 5DS uses a dedicated icon, rather than using the AF points. This means the level stays visible even when the shutter release is pressed to focus the lens.

When using manual focus in Live View mode, the on-screen image can be magnified by 6x or 16x. This makes details clear, but you become acutely aware of how much wobble is introduced by touching the camera. It's a good reminder to engage Mirror Lockup mode. The ability to set the shutter to fire following a set delay after the shutter release is pressed means

**Even with a shutter speed of 1/60 sec and the 5DS and 100mm macro lens on a solid tripod, using the Mirror Lockup function produced a sharper result upon closer inspection**

that a remote release is unnecessary in many situations.

We found the options in the 5DS's Quick menu logical and used it on a frequent basis to change key settings, however, it's possible to customize the screen to remove any options that you don't use and change the size of the icons representing those that you do, which is a nice touch.

Although the 5DS isn't the natural choice for videographers, it's worth noting that, like the 5D Mark III, the large Quick Control Dial on the back of the camera can be used as a touch-control so that near silent adjustments can be made to aspects such as exposure and audio recording level.

### Performance

The great news is that the 5DS can resolve a fantastic amount of detail. If you want the ultimate in detail resolution, the 5DS R resolves a tiny bit more than the 5DS but you really have to look for it at 100 or 200% on a computer screen to spot the difference – it's only in the very finest detail areas. Both cameras out-resolve our resolution chart for most of their sensitivity range and capture the same level of noise. It's only at the highest sensitivity settings that they drop below the maximum score for the chart, and the 5DS R images look very slightly better. It's very hard to see a difference in real-world images.

At lower sensitivity settings, very fine details and subtle tonal gradations are visible at 100% in

## 50-MEGAPIXEL WORLD BEATER

**THE BENEFIT** of a high-resolution 50Mp camera is that, provided noise can be controlled, it captures more detail, and images can be printed at huge sizes. At 300ppi, the 5DS's 50Mp sensor can produce very high quality 30x20in prints. But at a lower 72ppi, the 8688x5792 images translate into massive 120x80in (or 10x6.5ft) prints – as viewing distances of such big prints and billboards are further away, any 'pixelation' won't be noticeable. The downside is that the photosites (or pixels) are smaller than on lower-res sensors, producing a weaker image signal that requires greater amplification.

This can be a recipe for low dynamic range and lots of noise, so camera engineers have to work hard to produce high-quality images.

Images also demand a lot of processing power, and this can slow down burst rates. As full-res 5DS Raw files are around 52-82MB and JPEGs are 10-29MB, memory cards fill up quickly, image transfer times increase and hard drive capacity is eaten up. Your computer may take ages to process 50Mp images; in which case, it may be time to upgrade, adding extra cost to the purchase. You may also need to buy better lenses to match the camera's resolving power.



**The huge-resolution images are incredible, but Raw files are huge too, requiring bigger memory cards**



## FULL TEST 5DS &amp; 5DS R

## FEATURES

01

Although it can record video, the 5DS has no headphone socket for audio monitoring.

02

While it's an advanced camera there is the option to use Scene Intelligent Auto mode.

03

The viewfinder can show the cropping when shooting 1:1 (square) format, as well as the 1.3x and 1.6x crop images.

04

You can create up to five My Menu tabs with customizable names in the Menu, and each can have up to six features.

05

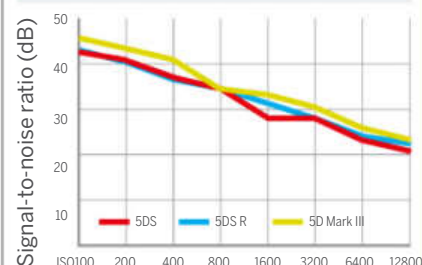
Images can be given a star rating to find them quickly after downloading.

06

HDR mode records both Raw and JPEG files and can be used like an advanced bracketing option.

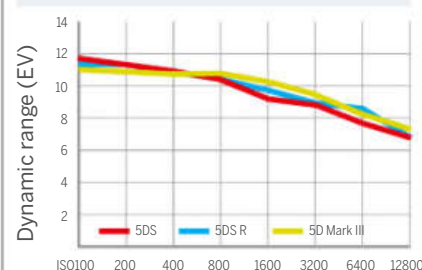


## RAW\* SIGNAL-TO-NOISE RATIO



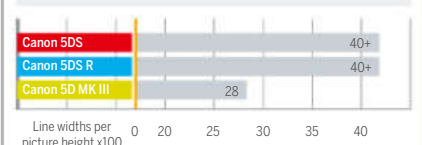
The 5DS produces noisier images than the 5D Mk III – not surprising given the pixel density of its sensor

## RAW\* DYNAMIC RANGE



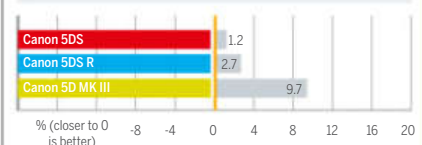
While the 5DS's dynamic range is good at lower sensitivities it doesn't match the 5D Mk III, particularly at upper values

## RAW\* RESOLUTION (AT ISO200)



The 5DS R resolves a little more fine detail than the standard 5DS, but both camera's results were off our test chart!

## COLOUR ERROR



These scores indicate that the 5DS and 5DS R produce JPEGs with a natural level of saturation in their default settings



Good light ISO100: very clean images  
Bad light ISO6400: noise well controlled



# GEARTEST





The 50-megapixel Canon EOS 5DS R was built to capture big, breathtaking shots, like this of the Yokohama skyline in Japan. It needs to be seen on your computer screen to be believed – download the high-res image from <http://downloads.photoplusmag.com/Canon5DSR.jpg>. Try zooming in, and zooming in...







JPEG files. Much of this is also visible in images taken at ISO6400, but there's a fine texture of luminance noise. Chroma noise is visible at 100% in simultaneously captured Raw files when all noise reduction is turned off, but it's not objectionable and we would have few qualms about using this setting if the lighting demanded it.

There's a suggestion of luminance noise in darker even-toned areas of JPEG and Raw files captured at ISO400, but you really have to look for it at 100% magnification on-screen. This noise becomes a little more noticeable in ISO800 images, with a hint of chroma noise becoming just visible in Raw files when all noise reduction is turned off.

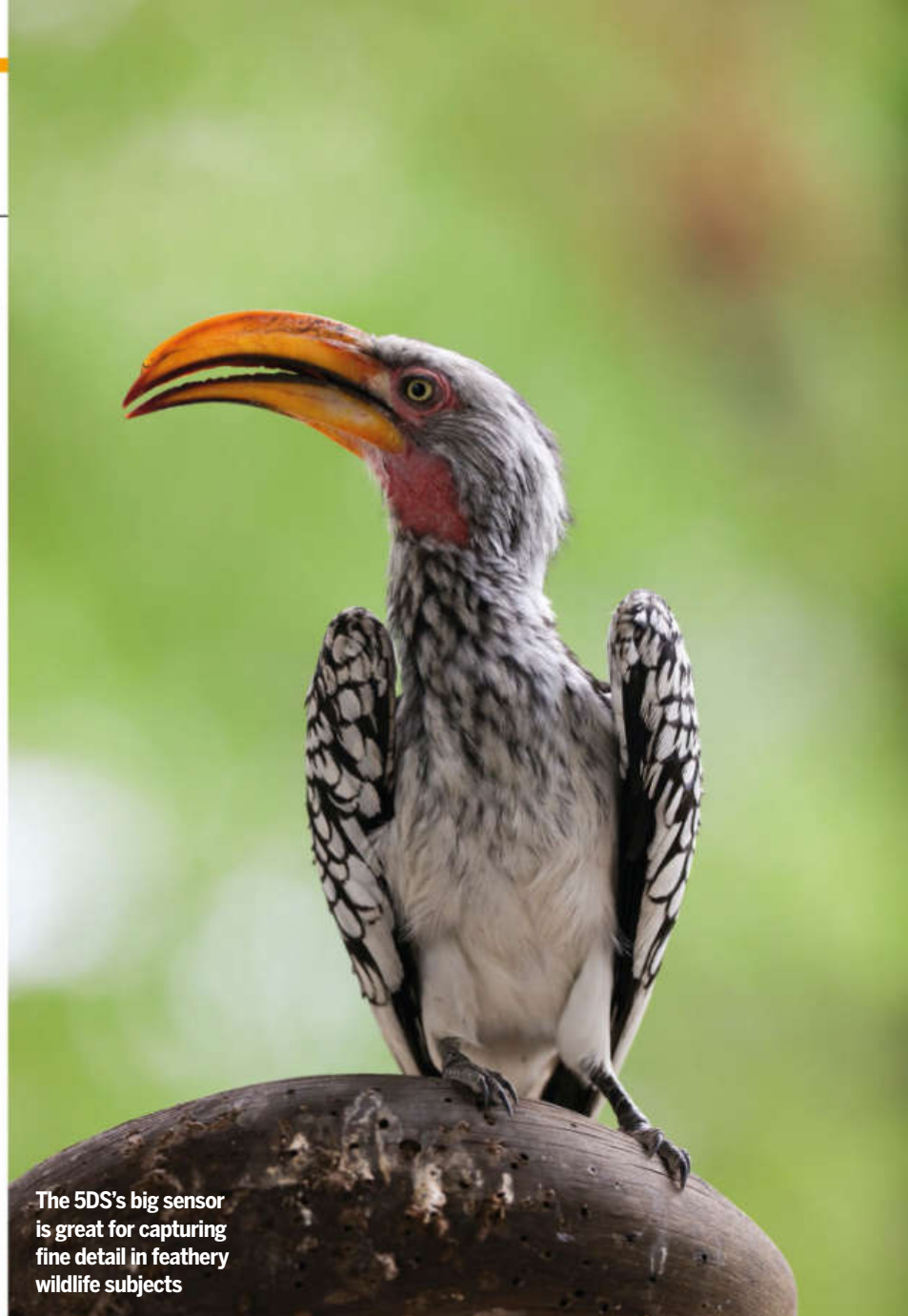
Our tests suggest that Canon could have given the 5DS higher sensitivity settings and image quality would have still been acceptable, but it seems the company has decided that the cameras should deliver the best stills images possible.

Like Canon's earlier iFCL metering system, the 252-zone RGB+IR metering system with

**Even cropping as severely as this leaves you with a 4500x3000 pixel image that's still big enough for an A2-size print**

## S OR SR?

**DIGITAL CAMERAS** traditionally have a 'low pass' filter in front of their sensors to overcome the problem of moiré (interference visible in fine, regularly repeated patterns). They do this by slightly softening the image, and in everyday photography it's well worth the compromise. However, if you only ever shoot 'natural' subjects, such as landscapes or wildlife, moiré isn't an issue, and this is the market that the 5DS R is aimed at. But rather than removing the filter, the Canon 5DS R has a secondary 'cancellation' filter that enables it to resolve a little more detail. This model also costs £200/\$200 more to buy.



**The 5DS's big sensor is great for capturing fine detail in feathery wildlife subjects**

Intelligent Scene Analysis of the 5DS applies a weighting to the exposure required by the subject under the active AF point, but it does a better job of assessing the rest of the scene and recommending exposure values that work for the scene as a whole.

As the 5DS has the same autofocus system as the 5D Mark III it was no surprise to find that it's extremely capable and can lock on to fast-moving subjects even in low light. When photographing a cycling event and shooting continuously at the 5fps maximum, we noticed that the camera started to warm up around the card port – we were using a UDMA 7 CF card. It didn't become hot, just slightly warm, however this seems to affect burst depth and the number of images you can shoot drops dramatically.

At the other end of the shooting rate scale, we found there's a clear

benefit to using Mirror Lockup when the camera is on a tripod, even with shutter speeds of around 1/60 sec and a 100mm focal length. We set the camera to take the shot one second after the shutter release was pressed and this produced sharper images than those taken without Mirror Lockup.

One notable side effect of the increased sensor resolution is that

**Images have incredible detail and look superb, with great colour and exposure in most situations**





faster-than-normal shutter speeds are desirable for handheld shooting; for example, with the Canon EF 24-70mm f/2.8L II USM lens mounted we found a shutter speed of 1/125 sec or faster was needed to be sure of achieving pin-sharp shots. Shooting slower is possible, but the results aren't as consistent.

Likewise, if you're shooting a moving subject you may find that you also need to use a faster shutter speed than you're used to because, although the images look sharp as thumbnails and even at normal viewing sizes, they aren't completely sharp at 100%. The smaller pixels mean that even tiny movements can cause some blur. You might scoff at this degree of pixel peeping, but there's no point in buying a 50Mp camera if you only use the images at a size that a 20Mp camera produces.

Canon cameras generally produce images with pleasing colours, and the 5DS is no exception. However, probably as a result of the extra pixels delivering the huge level of detail and smooth tonal gradations, some of the files have a bit more pep about them. Using the new Fine Detail picture style boosts micro-contrast a little, bringing out small details and giving edges a naturally sharp look.

**The Canon 5DS R has a low-pass 'cancellation' filter that is designed to resolve more detail than the 5DS; but in our tests the difference between the two cameras is only visible in the very finest details**

**On bright, sunny days with plenty of contrast and colour, the 5DS is in its element to capture vibrant landscape shots**



## THE VERDICT

An incredible level of detail, but do you need it?

**T**he 5DS/5DS R are designed to take high-quality still images, and they do this brilliantly. As expected in a 50-megapixel camera, the native ISO range and fps rate is less than the 22Mp 5D Mark III. The images from the 5DS have an incredible amount of detail and look superb, with great colour and exposure in most situations. If you want the absolute maximum level of detail, go for the 5DS R. However, you need to focus carefully, follow the guidelines about avoiding camera shake and ensure your lenses can match the resolving power (go to <http://bit.ly/canoneos5ds> for recommended EF lenses). Even then it can be hard to see the difference between its images and those from the 5DS.



### 5DS SPECIFICATIONS

**SENSOR** 50.6Mp full-frame CMOS sensor  
**IMAGE PROCESSOR** Dual Digic 6  
**AF POINTS** 61 (41 cross-type; 5 dual cross-type)  
**ISO RANGE** 100-6400 (50-12,800 exp.)  
**MAX IMAGE SIZE** 8688 x 5792  
**METERING ZONES** 252  
**HD VIDEO** Full HD 1080p at 30, 25, 24fps  
**VIEWFINDER** 100% coverage, 0.71x magnification  
**MEMORY CARD** SD/SDHC/SDXC (UHS-I compatible), CompactFlash  
**LCD** 3.2-inch 1,040K dots  
**TOP-PLATE LCD** Yes  
**MAX BURST** 510 JPEGs or 14 Raw files  
**FRAME RATE** 5fps  
**USB** 3.0  
**HEADPHONE JACK** No  
**SIZE** 152x116x76mm  
**WEIGHT (BODY)** 845g  
**PRICE (RRP)** £2999/\$3699 (5DS); £3,199/\$3899 (5DS R)



### 5D MK III SPECIFICATIONS

**SENSOR** 22.3Mp full-frame CMOS sensor  
**IMAGE PROCESSOR** Digic 5+  
**AF POINTS** 61 (41 cross-type; 5 dual cross-type)  
**ISO RANGE** 100-25,600 (50-102,400 exp.)  
**MAX IMAGE SIZE** 5760 x 3840  
**METERING ZONES** 63  
**HD VIDEO** Full HD 1080p at 30, 25, 24fps  
**VIEWFINDER** 98% coverage, 0.71x magnification  
**MEMORY CARD** SD/SDHC/SDXC (UHS-I compatible), CompactFlash  
**LCD** 3.2-inch 1,040K dots  
**TOP-PLATE LCD** Yes  
**MAX BURST** 16,270 JPEGs or 18 Raw files  
**FRAME RATE** 6fps  
**USB** 2.0  
**HEADPHONE JACK** Yes  
**SIZE** 152x116x76mm  
**WEIGHT (BODY)** 860g  
**PRICE (STREET)** £2299/\$2499

## VERDICT

**PROS:** Full-frame sensor resolves a huge amount of detail; built-in crop modes; excellent AF, exposure and white balance systems; extensive range of features  
**CONS:** Huge file sizes; fast shutter speeds or a sturdy tripod and Mirror Lockup essential to get the best from the sensor; no Wi-Fi built-in; need to use latest lenses  
**WE SAY:** The Canon 5DS and 5DS R are superb cameras that resolve a huge amount of detail in their 50Mp images,

especially the 5DS R, beating even vastly more expensive 50Mp medium-format cameras. A new benchmark has been set. Before you commit to the investment, however, make sure that you have the best lenses that can match the camera.

**FEATURES** ★★★★★  
**BUILD & HANDLING** ★★★★★  
**IMAGE QUALITY** ★★★★★  
**VALUE** ★★★★★  
**OVERALL** ★★★★★





## THE CONTENDERS



**Canon EF-S  
60mm f/2.8  
Macro USM**  
£330/\$420



**Canon EF  
100mm f/2.8  
Macro USM**  
£375/\$550



**Canon EF  
100mm f/2.8L  
Macro IS USM**  
£635/\$900



**Sigma Macro  
105mm f/2.8 EX  
DG OS HSM**  
£385/\$670



**Sigma APO Macro  
150mm f/2.8 EX DG  
OS HSM**  
£670/\$1100



# MACRO LENSES

*Ready for your close up? We put the most exciting macro lenses for Canon DSLRs through their paces, and pick out the best buys*

Shoot a landscape and you'll often be able to pick out individual leaves on trees, single stones on a path, and even separate blades of grass. Imagine then the near-microscopic level of detail you'd be able to see if you were to fill the whole image frame with something as small as a postage stamp. Pop a prime macro lens from this test group onto your Canon DSLR, and that's exactly what you'll be able to do. All of the lenses on test boast full 1.0x or 1:1 magnification. This means that, at their closest focus distance, they can reproduce small objects at full life size on the camera's image sensor. There are two 60mm lenses in the group, both of which are designed specifically for APS-C format cameras, while most of the others have focal lengths of between 90mm and 105mm, which are traditionally more popular for macro photography.

We've also included the latest Sigma 150mm and 180mm macro lenses, both of which feature image stabilization and a fairly fast widest aperture of f/2.8. Canon and Tamron also offer 180mm macro lenses, but they're rather older designs, dating back to 1996 and 2003 respectively. Let's take a closer look at what all the latest competing macro lenses have to offer...



**Sigma APO Macro**  
180mm f/2.8 EX DG  
OS HSM  
£1180/\$1700

**Tamron SP AF**  
60mm f/2 Di II LD  
(IF) Macro  
£310/\$525

**Tamron SP AF**  
90mm f/2.8  
Di Macro  
£300/\$500

**Tamron SP**  
90mm f/2.8 Di  
USD VC Macro  
£380/\$750

## GEARTEST

# CANON EF-S 60mm f/2.8 MACRO USM

Compact and lightweight, it's a tempting 'portrait macro' lens for APS-C format EOS cameras

£330/\$420

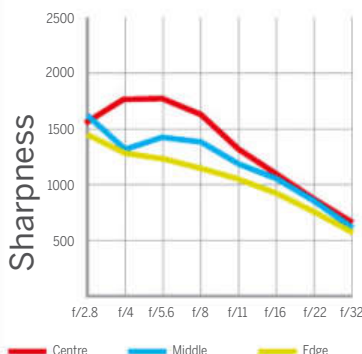
**T**he smallest and lightest lens in the group at just 73x70mm and 335g, this Canon is also one of the least expensive to buy. Designed solely for DSLRs with APS-C format image sensors, it has an 'effective' focal length of 96mm, making it useful for portraiture as well as macro photography on cameras like the 700D and 70D. As with nearly all other lenses in the group, the f/2.8 widest aperture enables a tight depth of field, although, in this respect, it's beaten by the Tamron 60mm lens that's also for APS-C cameras, which has an f/2 maximum aperture.

Build quality feels solid and the ring-type ultrasonic autofocus is fast – which is just as well, because the lens lacks a focus limiter switch, as featured on most competing lenses. One of the drawbacks of its relatively short focal length is that the minimum focus distance is also quite small, at 20cm (from the sensor). Fully internal focusing means the lens doesn't extend

in physical length, although at the closest focus distance there's just 9cm between the front of the lens and what you're shooting, which may be a bit close for comfort.

## Performance

Sharpness is good at f/2.8, but doesn't improve as much as with most competing lenses through mid-range apertures, and falls off more at very narrow apertures. This can be a concern when you need to use narrow apertures to gain depth of field in macro shooting. A plus point is that this lens produces the least distortion of any in the group.



## FEATURES

- 01** The filter thread is the smallest in the group at 52mm.
- 02** There's only an AF/MF switch – no focus range limiter.
- 03** Ring-type ultrasonic autofocus features the usual manual override option.
- 04** As with other lenses on test, the focus distance scale has magnification factor markings.
- 05** The diaphragm has seven blades; most competing lenses have eight or nine.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## HOW WE TEST

We combine real-world shooting results with rigorous lab testing to arrive at our overall ratings



**T**o test their real-world performance, we use lenses in all sorts of lighting conditions, both indoors and outdoors. We check for good build quality and handling, smooth and precise operation of all controls, and we test the speed and accuracy of autofocus. We typically test full-frame compatible lenses on a range of full-frame and APS-C format bodies, whereas lenses that are designed specifically for APS-C format bodies are tested on cameras like the 70D and 7D Mk II. In-camera corrections

for chromatic aberrations and peripheral illumination (where available) are disabled throughout testing, to better reveal the true performance of each lens. We run a full range of lab tests under controlled conditions, using the Imatest Master and DxO Analyser suites. Photos of test charts are taken across the range of apertures and zoom settings (where available), then analysed for sharpness, distortion and chromatic aberrations (colour fringing). A summary of results is shown on the following pages.



# CANON EF 100mm f/2.8 MACRO USM

The next size up from Canon's 60mm macro lens, this EF 100mm is also full-frame compatible

£375/\$550

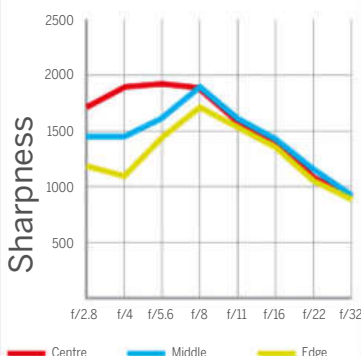
**T**he overall design and finish of this lens look very similar to the EF-S 60mm on test, but this one is substantially larger and nearly twice as heavy, at 79x119mm and 600g. Along with its longer 100mm focal length, the closest focus distance also greater at 31cm, which puts the non-extending front element 15cm from what you're shooting.

Further similarities to the EF-S 60mm include an optical layout based on 12 elements within eight groups, rapid yet quiet ring-type ultrasonic autofocus, the lack of image stabilization, and the lack of a supplied lens hood, which is available as an optional extra. The larger 100mm lens has a more rounded aperture based on eight diaphragm blades rather than seven, and adds a focus limiter switch; however, it's only a basic two-position switch that merely offers the option of locking out the shorter end of the autofocus range. An optional tripod collar is also available, for a

better balance and easy switching between landscape and portrait orientation in tripod-mounted shooting.

## Performance

Levels of sharpness follow a similar path through the aperture range as the EF-S 60mm lens, although outright sharpness is a little better, especially between f/8 and f/16. There's marginally less colour fringing, although barrel distortion is slightly more perceptible. Overall macro performance is very good, but the lack of image stabilization is an issue for handheld telephoto shooting.



## FEATURES

- 01** At 58mm, the filter thread is rather smaller than the 67mm of the newer EF 100mm IS lens.
- 02** Super Spectra coatings fend off ghosting and flare.
- 03** The two-position focus limiter switch locks out the short end of the range.
- 04** An optional tripod collar fits around the rear of the lens.
- 05** The aperture is based on an eight-blade diaphragm.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

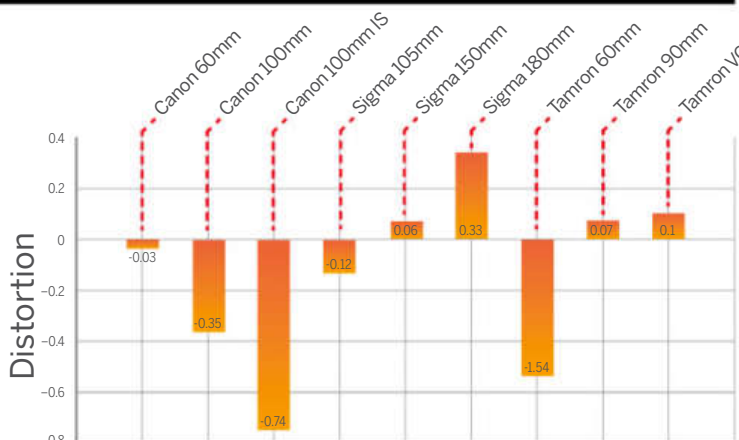
### OVERALL

★★★★★

## DISTORTION

There should be merely marginal amounts of barrelling and other distortions from a macro prime lens

**G**iven that macro lenses are often used for recording documents and for scientific purposes, it's important that they're relatively free of distortion – and this is reflected in our graph. Indeed, distortions are much lower than in most 'macro zoom' lenses, which typically offer a lower maximum magnification factor of around 0.33x/1:3 and 0.5x/1:2. Macro lenses are also generally designed to be 'flat field' lenses, so that corner-to-corner sharpness is good when photographing documents and flat surfaces head-on.



Negative results of higher values indicate greater barrel distortion

GEARTEST

# CANON EF 100mm f/2.8L MACRO IS USM

Canon's newest, range-topping macro lens is the only one in the company's 'L' for Luxury line-up

£635/\$900

Despite being an L-series lens, the build quality of this 100mm doesn't feel quite as solid as some of Canon's other premium professional lenses. At least it has a weather seal ring on its mounting plate, matched only by the Tamron 90mm VC USD lens in this group. A lens hood is included, but the tripod mount collar is only available as an optional extra. The focus limiter switch goes one better than that of Canon's cheaper 100mm, as it enables you to lock autofocus to either the short or long end of the range.

One of this lens's selling points is that it features a 'hybrid' stabilizer. Canon claims it can more effectively correct 'lens shift' movement as well as the usual angular vibration. In our tests, though, the overall effectiveness of stabilization, and the way it drops off from a four-stop to a two-stop benefit as the focus distance is reduced, is closely

matched by the stabilized Sigma and Tamron lenses. The shortest focus distance puts the front of the lens at 13.5cm from the target.

### Performance

Sharpness is impressive throughout the aperture range. However, in our 'real world' tests, the Sigma lenses managed to retain marginally greater fine detail at or near their very closest focusing distances. Barrel distortion is minimal, but still worse than with any other lens on test.



### FEATURES

- 01 The 67mm filter thread is relatively large for a 100mm macro lens.
- 02 Unusually, the focus distance scale is positioned at the front of the lens.
- 03 The focus limiter gives 30-50cm, 50cm-infinity and full-travel options.
- 04 The hybrid image stabilizer has a straightforward on-off switch.
- 05 The diaphragm has nine blades, beating the other Canons.

### VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
IMAGE QUALITY	★★★★★
VALUE	★★★★★
OVERALL	★★★★★

## THE X FACTOR

Magnification factor and exposure

As you reduce the focus distance in a macro lens the magnification factor increases, but the amount of light transmitted through the lens falls off. This typically equates to about two f-stops at the very shortest focus distance. Exposures are adjusted automatically by the camera's metering system, but if you use a separate light meter you'll need exposure compensation of about the amounts shown in this sequence.



0.20x/1:5 +0.33EV



0.33x/1:3 +1.0EV



# SIGMA MACRO 105mm f/2.8 EX DG OS HSM

It's significantly less expensive than the Canon 100mm IS lens, but is it as good?

£385/\$670

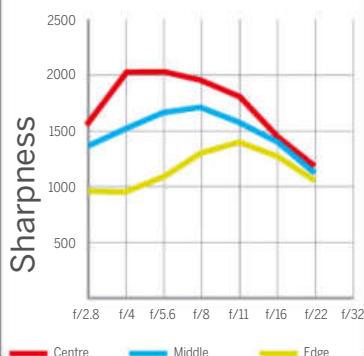
**A**lmost identical in physical size to the Canon 100mm L-series lens, the construction of this Sigma feels a bit more solid, and it's 100g heavier at 725g. Even so, it doesn't need a tripod mounting collar, although it's a shame Sigma doesn't offer one as an optional extra. Sigma does supply collars as standard with its heavier 150mm and 180mm lenses, and all three come complete with not only a hood, but also a hood extender for optimized efficiency when using APS-C format cameras.

The lens features a three-position focus limiter switch and an optical stabilizer. It's not a 'hybrid' stabilizer, as fitted to the Canon 100mm IS lens, but proves equally effective while also adding a secondary panning mode. Ring-type ultrasonic autofocus is swift and quiet, and the well-rounded diaphragm is based on nine blades. At its

closest focus distance of 31cm, the front of the lens is 14cm from the target.

## Performance

Sharpness is excellent at mid-range apertures, and still good at narrow apertures. Colour fringing is minimal, and distortion is essentially a non-issue. Overall, the Sigma's performance is as impressive as Canon's 100mm IS lens, but the Canon is about 50 per cent more expensive, making the Sigma 105mm exceptional value for money.



## FEATURES

**01** The filter thread is a mid-sized 62mm.

**02** As usual, focus distance is calibrated in feet and metres, as well as magnification factor.

**03** The focus limiter switch enables 30-45cm, 45cm-infinity and full autofocus range.

**04** The dual-mode stabilizer includes a panning option.

**05** The rounded aperture is based on nine blades.



## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★



0.50X/1:2 +1.33EV



0.67X/1:1.5 +1.67EV



1.0x/1:1 +2.0EV

## GEARTEST

# SIGMA APO MACRO 150mm f/2.8 EX DG OS HSM

This Sigma bumps up the focal length, but without going over the top in terms of purchase price

£670/\$1100

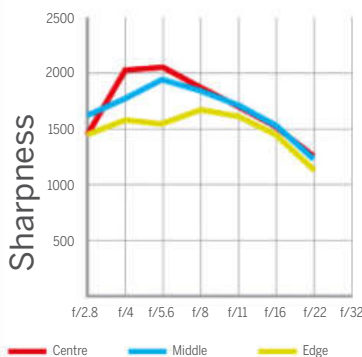
**T**his lens is significantly more expensive than the Sigma 105mm on test, but compares favourably in this respect with the Canon 100mm IS. The main gain is an extension in closest focus distance. The lens isn't much longer physically than the Sigma 105mm, so the distance from front of lens to target increases from 15cm to 19cm, giving you a couple of extra inches to work with.

The optical design includes three Special Low Dispersion elements to counter colour fringing. Build quality feels of the same high standard as the 105mm lens but, as this one is weightier at 1150g, a tripod mounting collar is included – this enables easy rotation for landscape and portrait orientation shooting and keeps the weight well centralized. The layout of switches is identical in all three Sigma lenses, for operating a focus limiter to enable short, long or

full autofocus travel, plus a dual-mode optical stabilizer.

## Performance

Colour fringing is of a similar order to the Sigma 105mm, and levels of sharpness are also similar throughout the aperture range, although this lens loses out slightly to the 105mm between f/5.6 and f/11. All in all, it's only worth trading up from the 105mm to the 150mm if you want the extra macro shooting distance or greater telephoto reach.



## FEATURES

- 01** Along with extra focal length comes an increase in filter size to 72mm.
- 02** The manual focus ring is rather wider than the one on the 105mm lens.
- 03** Autofocus range can be locked either side of 53cm.
- 04** A tripod mounting collar is supplied as standard.
- 05** Nine diaphragm blades ensure a well-rounded aperture for smooth bokeh.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## WHAT FOCAL LENGTH?

How close do you need to get, and what other styles of shooting will you use the lens for?

Macro lenses with longer focal lengths tend to be physically bigger, but they can also be very effective as general fast telephoto primes



**F**or 60mm, 100mm, 150mm and 180mm macro lenses, the minimum focus distance is around 20cm, 30cm, 38cm and 47cm respectively. It's important to remember that the focus distance is measured from the 'focal plane' near the rear of the camera body, rather than from the front of the lens. With short focal length lenses in particular, you can therefore end up with the front of the lens being quite close to what you're shooting – which can make it hard to use flash or LED lighting. Whereas lenses with a longer focal length are less intrusive for shooting bugs. Macro prime lenses can also make very good 'fast' telephoto primes for general shooting, and their wide maximum apertures make them a good choice for portraiture too.



## MACRO LENSES

# SIGMA APO MACRO 180mm f/2.8 EX DG OS HSM

Take a step up to the big time of macro photography with this long – and heavyweight – lens

£1180/\$1700

Unique amongst macro lenses, this Sigma combines a long focal length with a wide aperture, and the combination doesn't come cheap, in terms of build, size or price. It's a big lens measuring 95x204mm, and is more than twice the weight of the Sigma 105mm at 1640g. It's also about three times the price. To enable sufficient light transmittance for its f/2.8 rating, the front element is large and the filter thread is an oversized 86mm.

Minimum focus distance is stretched further than with any other lens in the group, to 47cm. That's 9cm more than with the Sigma 150mm lens, but the distance between the front of the lens and the target only increases by 4cm, to 23cm. The simple reason for this is that the lens itself is substantially longer. There's a significant upgrade in terms of glass. Whereas the 150mm features three SLD elements,

the 180mm switches to three FLD (F Low Dispersion) elements, which are claimed to equal the performance of top-grade fluorite glass. The result should be a drop in colour fringing.

## Performance

Colour fringing is, however, actually slightly worse than in the other two Sigma lenses on test, despite the upgrade to FLD glass. The only slight increase in quality is in sharpness at the widest aperture of f/2.8.



## FEATURES

- 01** It's a big lens with a suitably big filter thread of 86mm.
- 02** Fluorite-quality 'FLD' glass is used for three of the elements.
- 03** The autofocus limiter has 47-67cm, 67cm-infinity and full travel settings.
- 04** Weighing in at 1640g, the lens needs its tripod mounting collar.
- 05** As in the other Sigma lenses on test, the diaphragm has nine blades.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

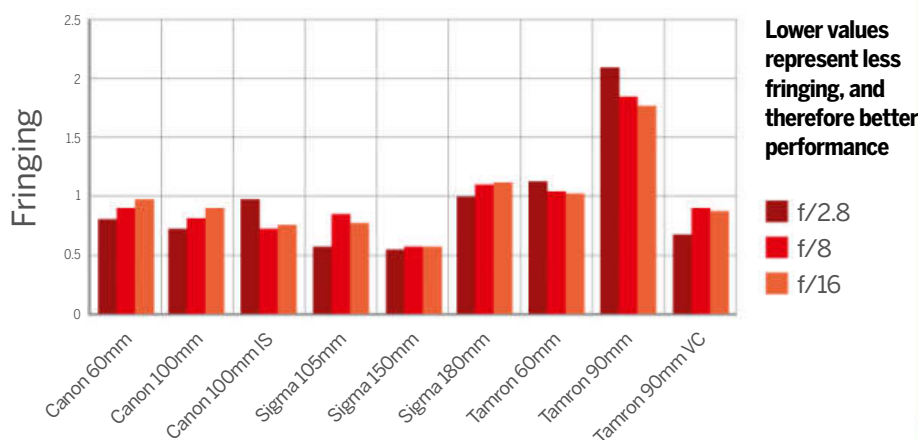
### OVERALL

★★★★★

## COLOUR FRINGING

These lenses mostly control fringing well

There's very little colour fringing when using any of these lenses. All three Canons, the Sigma 105mm and the Tamron 90mm VC USD are particularly good performers, and the Sigma 150mm is even better. Surprisingly, given its premium quality glass, the Sigma 180mm doesn't perform quite as well, and is more in line with the Tamron 60mm. The older of the two Tamron 90mm lenses is the least impressive.



## GEARTEST

# TAMRON SP AF 60mm f/2 DI II LD (IF) MACRO

It's a close match to the Canon 60mm lens in many respects, but there are some notable differences

£310/\$525

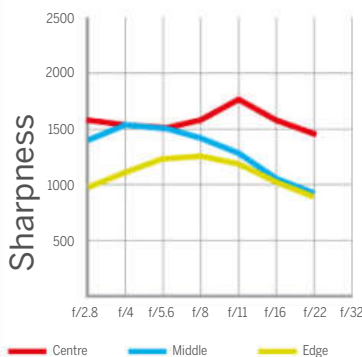
**B**uilt solely for APS-C format cameras, this Tamron leads the whole group for maximum aperture at f/2. All the other lenses are a whole f/stop slower at f/2.8, and while it's of little consequence for macro photography, the faster shutter speeds and smaller depth of field an f/2 aperture enables can be advantageous for general shooting, and especially for portraiture.

For macro shooting, the minimum focus distance is 23cm, and the distance between the front of the lens and the target is 10.5cm. Autofocusing is accurate but a little on the slow side, and the comparatively basic electric motor is clearly audible; on the plus side, and unusually for a system of this type, full-time manual override is available in One Shot autofocus mode. However, the focus ring itself feels quite sticky and lacking in smoothness, making the

very precise adjustments needed in macro shooting difficult to achieve.

## Performance

Sharpness throughout most of the aperture range is very similar to the Canon 60mm lens, although the Canon edges ahead between f/5.6 and f/8. There's also slight barrel distortion, which is practically nonexistent in the Canon lens. On balance, the Canon 60mm has the edge when it comes to APS-C-specific macro lenses.



## FEATURES

- 01** Given the f/2 widest aperture, the 55mm filter thread is on the small side.
- 02** The focus ring is comfortably large, but it's a little sticky in operation.
- 03** As in the Canon 60mm lens there's no focus limiter switch, just AF/MF.
- 04** The autofocus offers full-time manual override.
- 05** The diaphragm has seven blades, equalling the Canon 60mm lens.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## MACRO LIGHTING

Effective lighting can be tricky for macro photography, so it helps to use the right tools

**W**ith lose-up photography being very prone to blurriness caused by even the slightest movement on the part of the camera or subject, plentiful light is necessary to enable fast shutter speeds. A regular flashgun is powerful enough, as the distances between camera and subject are only small; however, these tend to give a harsh and directional light that creates deep shadows. A better option is to use a 'ring flash' or macro light, such as the Canon MR-14EX II Macro Ring Lite, which costs around £500/\$500. It incorporates dual, independently controllable flash tubes and mounts around the end of a lens, although an adaptor ring may be needed. LED modelling lamps aid composition and focusing.



The MR-14EX II features dual, independently controllable flash tubes and built-in LED modelling lamps



# TAMRON SP AF 90mm f/2.8 DI MACRO

This veteran Tamron is a macro favourite, but can it keep pace with the newer models?

£300/\$500

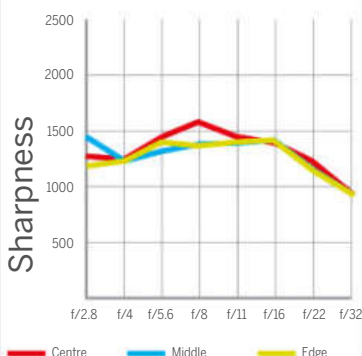
Originally launched nearly 20 years ago, the Tamron 90mm has been a favourite with macro photographers looking for good image quality at a budget price. However, it's starting to look a bit past its sell-by date compared with newer contenders, not least Tamron's own 90mm VC USD, reviewed over the page.

The lens is unique in this group, and not in a good way, as it lacks internal focusing. The inner barrel slides out and the lens almost doubles in length at its shortest focus setting of 29cm. This results in the front of the lens extending to just 10cm from the target in full macro magnification mode. The basic electric autofocus motor is relatively noisy and sluggish, and there's no full-time manual override – instead, the focus ring has a push-pull action for switching between auto and manual. On the plus side, manual focusing

benefits from silky-smooth operation, which enables very fine adjustments. There's also a focus limiter switch which can limit the range either side of about 45cm.

## Performance

We've praised this lens in the past but, compared with some of the latest designs, it's a little lacking in sharpness. Colour fringing is also more apparent than with any other lens in the group. The old Tamron is no longer the great-value buy it used to be.



## FEATURES

- 01** The front element remains deeply recessed through the focus range.
- 02** The inner barrel extends greatly at shorter focus distances.
- 03** There's a push-pull AF/MF mechanism in the focus ring.
- 04** The focus range limiter works for manual focusing as well as autofocus.
- 05** As in the newer Tamron 90mm there are nine diaphragm blades.

## VERDICT

### FEATURES

★★★★★

### BUILD & HANDLING

★★★★★

### IMAGE QUALITY

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## DEPTH OF FIELD

For macro, we're talking millimetres

0.5X/1:2 – f/2.8



0.5X/1:2 – f/8



0.5X/1:2 – f/22



Depth of field can shrink to just a couple of millimetres at full macro magnification. Even at a slightly longer focus distance that gives 0.5x/1:2 magnification, these shots of a matchbox-sized model bus show how small DoF can be – the back of the bus is 4cm further away from the camera than the front.

# TAMRON SP 90mm f/2.8 DI USD VC MACRO

Much more than just a revamp, this is a completely new and thoroughly modern design from Tamron

£380/\$750

**D**on't imagine that this new Tamron 90mm lens is just a revised version of the one reviewed on the previous page. Everything about it is comparatively state-of-the-art, including Tamron's proprietary VC (Vibration Compensation) stabilization system, which is very effective, and ring-type ultrasonic autofocus, which is super-fast.

Other improvements include internal focusing, which means the lens doesn't physically extend at shorter focusing distances. As such, at the minimum focus distance there's 14cm of clearance between the front end of the lens and your subject, rather than 10cm. Tamron's new 'eBand' nano coating is applied to reduce ghosting and flare, and another flourish is a weather seal on the mounting plate, as in the Canon 100mm L-series lens. Up at the front end, the manual focus ring is

large and has a smooth action, ideal for those fine macro focusing adjustments.

## Performance

Sharpness is almost as good as from the best lenses in the group at f/5.6 and narrower. However, there's a real lack of sharpness at f/2.8, and this Tamron doesn't quite hit its stride at f/4 either, which can be an issue when using it for general photography. Colour fringing is well controlled, matching most other lenses on test.



## FEATURES

- 01** The 58mm filter thread is slightly larger than in the old Tamron 90mm.
- 02** The large manual focus ring operates very smoothly.
- 03** A three-position switch can limit autofocus range to 30-50cm or 50cm-infinity.
- 04** Tamron's stabilizer is just as effective as the Canon and Sigma systems.
- 05** There's a weather seal ring on the mounting plate.

## VERDICT

FEATURES
★★★★★
BUILD & HANDLING
★★★★★
IMAGE QUALITY
★★★★★
VALUE
★★★★★
OVERALL
★★★★★

## BUDGET CLOSE-UPS

Don't want to splash out on a macro lens? There are a host of cheaper options for close-up photography to consider...

**A** macro lens is unquestionably best for quality close-ups, as well as enabling short telephoto shooting without any restrictions on the availability of longer focusing distances. However, if you only shoot close-ups occasionally, you can save money with cheaper alternatives. One option is a filter-style close-up 'lens', which screws










onto the front of a regular lens. Then there are reversing rings that enable you to mount a lens backwards on the camera, while hollow extension tubes distance a regular lens from the camera, so it can focus closer. There are even coupling rings for joining two lenses together, with the forward one being rear-facing.



Coupling rings enable you to join two lenses together by their filter threads for extreme magnification



## COMPARISON TABLE

	CANON EF-S 60mm f/2.8 MACRO USM	CANON EF 100mm f/2.8 MACRO USM	CANON EF 100mm f/2.8L MACRO IS USM	SIGMA MACRO 105mm f/2.8 EX DG OS HSM	SIGMA APO MACRO 150mm f/2.8 EX DG OS HSM	SIGMA APO MACRO 180mm f/2.8 EX DG OS HSM	TAMRON SP AF 60mm f/2.8 DI II LD (IF) MACRO	TAMRON SP AF 90mm f/2.8 DI MACRO	TAMRON SP 90mm f/2.8 DI USD VC MACRO
									
FULL-FRAME COMPATIBLE	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
EFFECTIVE FOCAL LENGTH (APS-C)	96mm	160mm	160mm	168mm	240mm	288mm	96mm	144mm	144mm
MAX MAGNIFICATION FACTOR	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x
MIN FOCUS DISTANCE	20cm	31cm	30cm	31cm	38cm	47cm	23cm	29cm	30cm
NARROWEST APERTURE	f/32	f/32	f/32	f/22	f/22	f/22	f/22	f/32	f/32
ELEMENTS/GROUPS	12/8	12/8	15/12	16/11	19/13	19/14	14/10	10/9	14/11
DIAPHRAGM BLADES	7 blades	8 blades	9 blades	9 blades	9 blades	9 blades	7 blades	9 blades	9 blades
AUTOFOCUS ACTUATOR	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Electric motor	Electric motor	Ultrasonic (ring-type)
INTERNAL FOCUSING	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
MANUAL AUTOFOCUS OVERRIDE	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Push-pull	Full-time
FOCUS LIMIT SWITCH	None	Long/full	Short/long/full	Short/long/full	Short/long/full	Short/long/full	None	Short/long/full	Short/long/full
IMAGE STABILIZER	No	No	Yes	Yes	Yes	Yes	No	No	Yes
FILTER SIZE	52mm	58mm	67mm	62mm	72mm	86mm	55mm	55mm	58mm
HOOD	ET-67B, £30	ET-67, £25	ET-73, included	Included	Included	Included	Included	Included	Included
DIMENSIONS (DIA X LENGTH)	73x70mm	79x119mm	78x123mm	78x126mm	80x150mm	95x204mm	73x80mm	72x97mm	76x123mm
WEIGHT	335g	600g	625g	725g	1150g	1640g	350g	400g	550g
TARGET PRICE	£330/\$420	£375/\$550	£635/\$900	£385/\$670	£670/\$1100	£1180/\$1700	£310/\$525	£300/\$500	£380/\$750
FEATURES	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
BUILD & HANDLING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
IMAGE QUALITY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
VALUE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

## THE WINNER IS... SIGMA MACRO 105mm f/2.8 EX DG OS HSM

For the best image quality at a refreshingly reasonable price, Sigma's macro lens fits the bill

**C**anon's 100mm IS USM is a great lens, but the Sigma 105mm matches it all the way for image quality, stabilization and handling, as well as autofocus accuracy and speed. Build quality feels every bit as good too, yet the Sigma is significantly less expensive than the Canon, making it our all-round best buy. Sigma's longer 150mm and 180mm lenses are also excellent, but much pricier, and only worth the extra outlay if you really need the longer

focal lengths. The Tamron 90mm VC USD is another highly attractive lens. In most respects it's almost as good as the Sigma 105mm, but it comes up short on sharpness at wide apertures – that's no real concern for macro photography, but it can be an issue in general shooting. Of the APS-C Canon and Tamron 60mm lenses, the Canon wins out and makes a nice portrait lens – but we'd still prefer the Sigma 105mm on any APS-C body for macro shots.





## THE CONTENDERS



**Canon Speedlite 320EX**  
£175/\$210



**Canon Speedlite 430EX II**  
£200/\$250



**Canon Speedlite 600EX-RT**  
£450/\$500



**Xgloxy GX-F990C TTL Flash Canon**  
£130/\$200



# E-TTL FLASHGUNS

*Dedication is what you need for effective flash.  
It's time to put the best Canon-compatible  
flashguns to the test*

A flashgun is probably the most important and versatile photographic accessory you'll ever buy. Not just for adding essential illumination to gloomy interior shots or for making an appearance after dark, a flashgun is equally useful under the midday sun. We've all seen (and probably taken) sunny-day portraits where eyes have turned into black holes and there are ghastly shadows under noses and chins. Fill-in flash can bring a glint to the eyes and banish the shadows.

Better still, 'dedicated' flashguns, as featured in this group test, are designed to enable Canon's specific E-TTL (Electronic-Through The Lens) flash metering, taking hard work and mathematical calculations out of your photography – always a good thing. Pre-flash pulses enable the camera to work out just how much flash power is required, and to set the flashgun output accordingly. Even the most-basic modern flashguns can do clever flash tricks but we've gone more up-market in our choice of contenders here.

Flashguns in this test group feature bounce and swivel heads to enable softer and more flattering lighting techniques, as well as manual or automatic zoom mechanisms, for increasing the range when using longer focal length lenses. On top of that, you'll find wireless remote functions for off-camera flash, and advanced modes like HSS (High Speed Sync) and RC (Rear Curtain) operation. Even so, there can be very notable differences between the flashguns on test, so let's get started.



**Metz 52 AF-1  
Digital**  
£180/\$300

**Metz 64 AF-1  
Digital**  
£300/\$480

**Nissin Di866 MK II  
Professional**  
£200/\$350

**Phottix Mitros+ TTL  
Transceiver**  
£300/\$400

## GEARTEST

# CANON SPEEDLITE 320EX

£175/\$210

One of the least expensive flashguns on test, it's also the most basic, but wireless slave mode works well

**S**maller and lighter than any other flashgun in the group, the 320EX is also light on features. It has no motorized zoom facility, no LCD screen around the back, and no red AF assist lamp. Instead, you can only manually switch the head between 24mm and 50mm zoom settings, which soon runs out of reach for telephoto shooting, and there's no diffuser panel for wider-angle coverage, either.

With the lack of on-board controls or an LCD screen, you have to set flash exposure compensation or manual power levels via menus from the host camera. This can be a little long-winded. The lack of a red AF-assist light also means that the autofocus beam comes courtesy of an annoying stream of pulses from the main flash tube, like when using a camera's pop-up flash for the same purpose.

It's not all doom and gloom. The 320EX is particularly easy to use in wireless slave mode and, in this group, boasts a

unique feature. It's the only one with a built-in constant LED lamp, which is potentially useful for video shooting and close-up photography.

## Performance

Despite its lowly GN (Guide number) rating of 32, the measured output power at 24mm and 50mm zoom settings matches that of the more powerful Canon 430EX II. Recycling speed is also brisk, at as little as 2.7 seconds from a full-power flash. E-TTL (Electronic-Through The Lens) flash metering is accurate but the video lamp lacks sufficient power to be genuinely useful.



## FEATURES

- 01** The relatively small head has no pull-out wide-angle diffuser or fill-in card.
- 02** There's no red AF-assist light but the constant video LED lamp is unique.
- 03** Decent build quality includes a metal mounting foot.
- 04** Switches give access to three groups and four channels for wireless slave use.
- 05** With only a basic Manual/Auto switch, power needs to be set from the camera.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## HOW WE TEST

Our two-stage procedure combines extensive real-world shooting with rigorous lab tests



**A**ll features were tested for each of the flashguns. These typically include on-board flash exposure compensation and manual power settings, motorized zoom heads and advanced modes like high speed sync, rear curtain and strobe flash. To test power output, we used a flash meter one metre from each flashgun. We checked the complete range of manual power settings, in one-stop increments. Based on ISO100, the figures correlate directly with the Gn (Guide number). The results were checked by taking shots with the appropriate lens apertures and using the camera's histogram display in playback mode. This was done for flash zoom settings of 24mm, 50mm and 105mm.

We also checked the accuracy and consistency of E-TTL (Electronic-Through The Lens) flash metering (see opposite), and the speed with which each flashgun could recycle after a full-power flash, using both Ni-MH and alkaline cells.



# CANON SPEEDLITE 430EX II

£200/\$250

The most mainstream Canon offering, the 430EX II is soon to be replaced but still packs a punch

Canon couldn't get a review sample of the new 430EX III-RT to us in time for this round up, but there's still plenty of life in the Mk II edition, which also costs £50/\$50 less. Some may also prefer the Mk II's more conventional control panel, which puts a wealth of functions at your fingertips.

Only a little pricier than the 320EX, this flashgun has a much higher specification. The motorized zoom head has a range of 24-105mm and includes a pull-out diffuser for ultra-wide-angle shooting. Essentials include a red AF-assist lamp, on-board controls for auto/manual power settings, high-speed sync and rear-curtain modes. To be fair, the 430EX II doesn't have any flash modes that aren't also available in the 320EX, but it's handy being able to get to them without resorting to camera menus.

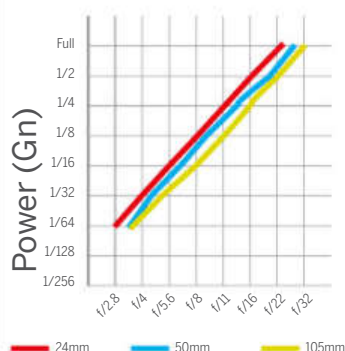
This flashgun loses out to the new Mk III edition in that it lacks RF (radio frequency) wireless transmission. Instead,

it operates in Canon's more conventional wireless slave mode, and there's no facility to use it as a wireless master for triggering other flashguns.

## Performance

Maximum output power matches – or even beats – most other flashguns on test, as revealed in our lab tests.

E-TTL metering is sharp and consistent, and recycling speeds are quick. Overall, it's a good performer and works seamlessly with Canon cameras, as you'd expect. Despite the new Mk III now on sale, the Mk II is an attractive purchase at the price.



## FEATURES

01

The flash head is larger than the 320EX and adds a wide-angle diffuser.

02

A sensor beneath the main flash head enables wireless slave operation.

03

The AF-assist lamp enables accurate autofocus even in complete darkness.

04

It's a fairly small backlit LCD but it displays important shooting info.

05

Control buttons are well laid out, logical and intuitive to use.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

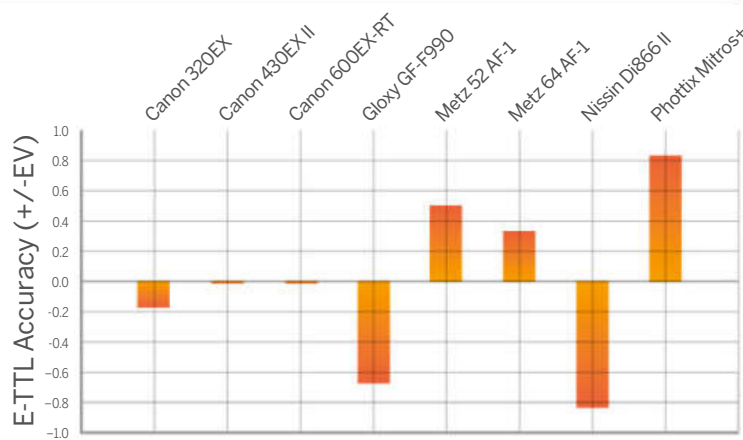
### OVERALL

★★★★★

## E-TTL ACCURACY

The accuracy of through-the-lens flash metering can vary noticeably between each flashgun...

To check the accuracy and consistency of E-TTL flash metering, we took a series of shots at a variety of distances, using lenses of various focal lengths. In each case we filled the frame with a Lastolite grey card and relied on E-TTL metering to give the correct flash exposure. The results were checked in Digital Photo Professional, viewing the spike produced on the histogram display. Any inaccuracies were measured by applying exposure compensation of the required amount to put the histogram spike at the correct position.



Results closest to zero indicate greatest flash metering accuracy

## GEARTEST

# CANON SPEEDLITE 600EX-RT

£450/\$500

Canon's top-flight, fully pro-grade flashgun is feature-rich, highly advanced and well built

Considering this costs more than an EOS 700D, you'd expect it to be something special. It's robust and rugged, with weather-seals and a large flash tube with a powerful Gn 60-rated output, a generous 20-200mm motorized zoom, pull-out wide-angle diffuser and fill-in reflector card.

Unlike other Canon flashguns on test, this one features full 180-degree swivel in both left and right directions, as well as adding a -7 degree downward tilt that still rises to a full 90-degree upright setting. It offers master, as well as slave, functions in wireless modes. Better still, it adds RF wireless triggering, which extends the range to 30m and works through obstacles. With multiple EX-600RT flashguns, you can also fire the camera from a remote flashgun.

Pro features lacking in the other Canon Speedlites include a power input socket for running the flashgun from an optional external power

pack, and a PC sync terminal for triggering via a cable. The 600EX-RT also adds a strobe flash mode, for programmable sequential bursts of output during long exposures.

## Performance

Performance is every bit as good as you'd hope for in Canon's top professional flashgun. E-TTL metering is superbly accurate, practically guaranteeing consistent results throughout shooting sessions. The maximum power output is mighty and the range of basic and advanced settings is easily controllable through the excellent control panel.



## FEATURES

- 01 The large flash head has a diffuser panel and a fill-in reflector.
- 02 Going further than most, the motorised zoom covers a range of 20-200mm.
- 03 Sockets at the side include an external power input and PC sync terminal.
- 04 The large backlit LCD gives a wealth of information for all flash modes.
- 05 The upper bank of control buttons are context-sensitive, labelled on the LCD.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## GETTING FLASHY

Bounce, swivel and off-camera options

Without flash, poorly lit subjects can look dull and lifeless. Direct flash can be overly harsh. Bouncing the flash off a ceiling or wall softens the light but, for portraits, eyes can lack sparkle. A diffusion dome combines direct and bounced light for a more balanced effect but can cause unsightly shadows. Remote, off-camera flash gives best results, with natural modelling for 3D-looking images.



No Flash



Direct Flash



# GLOXY GX-F990C TTL FLASH

£130/\$200

The Gloxy punches above its weight and well above its price tag, but isn't entirely happy about being a slave

**T**he size, weight and control panel layout of this flashgun bear more than a resemblance to Canon's top-flight EX600-RT, yet it's the outright cheapest flashgun in the whole group. It can't match the Canon's weather-sealed build quality but the feature list looks highly desirable. The claimed maximum Gn 54 certainly isn't short on power, while advanced flash modes include a programmable strobe as well as the usual high-speed sync and rear-curtain options.

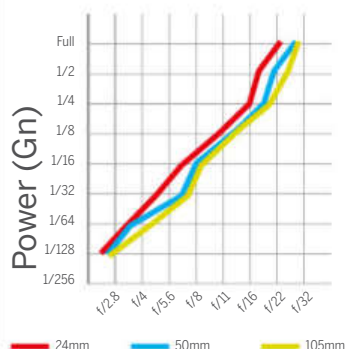
Like the EX600-RT, there's 180-degrees of swivel in both directions and -7 to 90 degrees of bounce. The flash head includes a wide-angle diffuser and a fill-in reflector card, and has a 18-180mm zoom range. There are sockets for PC sync and an optional external power pack, and it's supplied with a diffusion dome and a set of coloured filters.

There's only one real omission to the extensive features and up-market specs; it can't operate in wireless

slave mode. You can still use it in a more basic 'optical slave' mode, though, where a built-in photoelectric cell registers a flash from another flashgun and fires at manual power settings between full power and 1/128 output.

## Performance

Maximum output power proved a little disappointing, and lower than that of the Canon 430EX II. E-TTL accuracy could also be better, generally giving results that are under-exposed by about two-thirds of a stop. Recycle speeds are fairly quick though, even after a full-power flash.



## FEATURES

- 01** The large flash tube enclosure includes a diffuser panel and reflector card.
- 02** A powerful 10x zoom range is equivalent to focal lengths of 18-180mm.
- 03** Just below the red AF-assist lamp is a socket for an external power pack.
- 04** A PC sync terminal is at the side, under a rubber flap.
- 05** The interface looks similar to the Canon 600EX-RT's, but is relatively basic.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★



**Bounce Flash**



**Diffusion Dome**



**Off-Camera Flash**

# GEARTEST

## METZ 52 AF-1 DIGITAL £180/\$300

The less expensive of the two Metz flashguns on test, the 52 AF-1 nevertheless offers advanced functions

This competitively priced flashgun delivers a strong Gn 52 maximum power rating and plenty of high-end thrills. The bounce and zoom head features 180 and 120 degrees of swivel to the left and right respectively, 0-90 degrees of tilt, and 24-105mm motorized zoom. There's a wide-angle diffuser and reflector card, and the usual red light for AF assist.

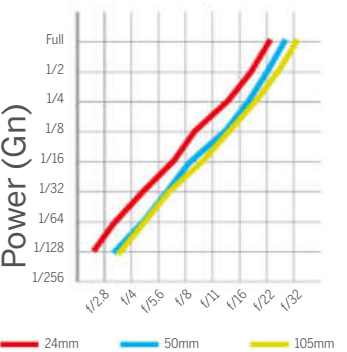
What's more unusual, especially at the price, is that the 52 AF-1 features full wireless master and slave modes, compatible with other Canon and third-party flashguns. Moreover, setup is easy and intuitive, thanks to a touchscreen display at the rear. It requires a fairly vigorous prod at times, but at least you can operate it with gloves on. To help keep your own head on straight when the flashgun's head is pivoted for portrait-orientation shots, a built-in sensor enables automatic screen rotation.

A USB port enables firmware upgrades to be

applied via a computer, theoretically ensuring continued compatibility if Canon makes operational changes to its camera bodies.

### Performance

Despite its higher Gn 52 rating, compared with the Canon 430EX II's Gn 43, both flashguns gave virtually identical maximum power outputs in our tests. Recycling speeds are noticeably slower from the Metz, and E-TTL flash metering is a little on the bright side. Overall, it's a good choice if you want full wireless master/slave functions, without paying over the odds.



### FEATURES

- 01 The tube is a little smaller than the Metz 64 AF-1's, and there's no sub-flash.
- 02 A wide-angle diffuser extends the 24-105mm zoom range to 12mm.
- 03 Sideways swivel is of 180 degrees to the left and 120 degrees to the right.
- 04 A clutter-free back panel relies on a mono touchscreen with auto rotation.
- 05 A flash test/ready button sits beneath the menu button.



### VERDICT

FEATURES
★★★★★
BUILD QUALITY
★★★★★
PERFORMANCE
★★★★★
VALUE
★★★★★
OVERALL
★★★★★

## CLEVER HEADS

Flashguns often have useful extras built in

All these flashguns have bounce and swivel heads but some can point downwards, as well as up, for extreme close-ups, and some swivel a full 180 degrees in only one direction, others manage both directions. All but the Canon 320EX feature motorized zooming of at least 24-105mm, but some stretch as far as 200mm. A wide-angle diffuser is usually available, flipping over the flashgun's tube to enable ultra-wide-angle firing. Some also add a slide-out reflector card.

Most flashguns feature both a wide-angle diffuser panel and a fill-in reflector card that slide out of the upper housing





# METZ 64 AF-1 DIGITAL

£300/\$480

Metz's range-topping flash combines professional-grade specifications with touchscreen ease of use

**B**igger and more powerful than the Metz 52 AF-1, this new flash takes everything to a higher level. The maximum power rating is Gn 64 at the telephoto end of its longer 24-200mm zoom range, vertical bounce reaches down to -9 degrees and, uniquely in this group, manual power can be adjusted down to 1/256th. Advanced flash modes include programmable strobe as well as HSS and rear-curtain.

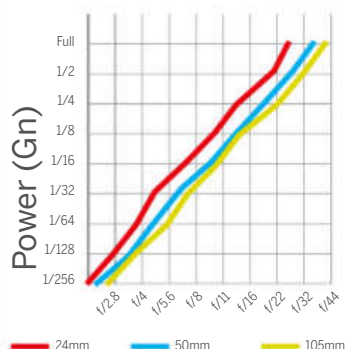
Another useful feature is the provision of a secondary sub-flash tube. You can adjust the sub-flash power independently and it's neat for adding a little direct flash when using the main flash tube in bounce mode.

Additional top-end features lacking in the 52 AF-1 include a PC sync terminal and a socket for attaching an external power pack. The USB port for applying firmware upgrades is retained, whereas the touchscreen is bigger and has a colour, rather than mono, display. It still features

auto rotation for landscape and portrait-orientation shooting and a bonus is that, in our tests, touch-sensitivity proved more responsive.

## Performance

Recycling speeds are faster than in the Metz 52 AF-1, despite the more powerful output. In our tests, maximum output itself proved a little lower than from the Canon 600EX-RT in the 105-200mm section of the zoom range, but it still outshone everything else in the group. E-TTL flash metering is slightly bright. Overall, it's a top performer and good value at the price.



## FEATURES

**01** The large flash head has the usual wide-angle diffuser and fill-in reflector card.

**02** The sub-flash is great for adding a little direct flash when the main tube is in bounce mode.

**03** There's a PC sync terminal and a socket for an optional external power pack.

**04** A colour touchscreen makes adjusting parameters a doddle.

**05** The uncluttered rear has the minimum amount of buttons.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

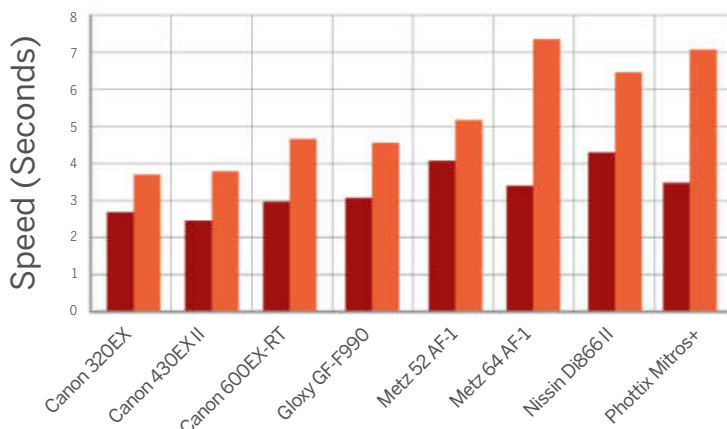
### OVERALL

★★★★★

## RECYCLE SPEED

How long will you have to wait?

**A**t low power settings, most flashguns recycle almost instantly, so they're ready to fire again with practically no delay. However, at high power settings, recycling can take several seconds. It can be especially frustrating if you're trying to capture a definitive moment by taking a sequence of shots. Our graph shows the recycle speed for each flashgun after a full-power flash, using freshly charged Ni-MH and new alkaline batteries.



Here's how long it takes each flashgun to recycle after a full-power flash. Lower scores are better.

■ NiMH  
■ Alkaline

## GEARTEST

# NISSIN DI866 MK II PROFESSIONAL

£200  
\$350

The Mark II edition of this flashgun aims to cater to professional aspirations, at consumer-friendly price

**Y**ou wouldn't expect a flashgun at the lower end of the price range to have 'professional' features, but as well as a Gn 60 power rating, this has a full complement of high-speed sync, rear-curtain and programmable strobe modes.

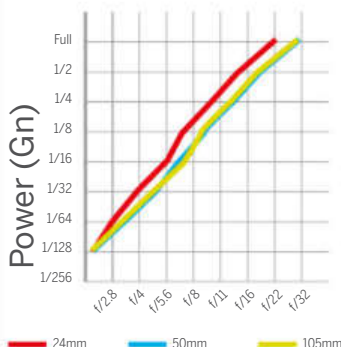
Like the Metz 64 AF-1, it also includes a secondary sub-flash module and a colour LCD screen with auto rotation, although this is much smaller and lacks touch-sensitivity. Instead, there's a four-way pad surrounding a 'Set' button, which proves similarly quick and easy for adjusting settings.

Full wireless master/slave functions are available but, surprisingly, the Nissin is the only flashgun in the group in which custom settings can't be changed from the Flash Control menu in the host camera. Connection sockets include PC sync, USB and an input for an optional external power pack. For regular fitment of four AA cells, additional caddies are also available to enable speedy

changeover if your batteries go flat at the wrong moment.

## Performance

We suffered significant underexposure throughout our E-TTL tests, equivalent to nearly a full f-stop. Maximum output power also proved disappointing, equating to just Gn 29, with no increase in effective power when zooming from 50mm to the full telephoto stretch of 105mm. Despite delivering less output power than most competing flashguns, recycling speed is fairly slow. In all, the Nissin is feature-rich but disappointing in its performance.



## FEATURES

- 01** The motorized zoom head covers a standard range of 24-105mm
- 02** A wide-angle diffuser and fill-in reflector card are included.
- 03** Like the Metz 64 AF-1, the Nissin has a secondary sub-flash tube.
- 04** The colour LCD screen has auto rotation.
- 05** Menus are navigated via a four-way pad and Set button.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

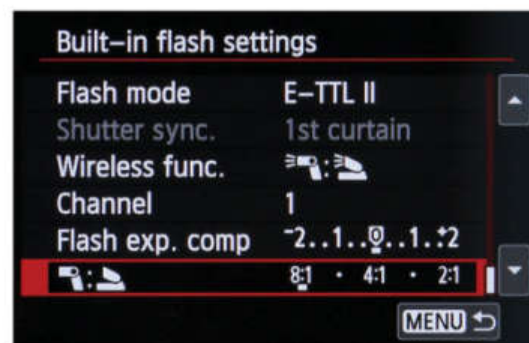
## GO WIRELESS

Cable-free, off-camera flash is available in most Canon DSLRs

**A**part from the 1100D, 1200D and 100D, all Canon DSLRs from the 600D onwards that feature a built-in flash can trigger remote flashguns wirelessly. You can configure the pop-up flash to act as a wireless master via the Flash Control option in the camera's shooting menu, and then set the flashgun to wireless slave mode. All but the Gloxy flashgun

in this test group feature a wireless slave mode, and some also feature full wireless master/slave options, so can also be used as a controller.

Options include 'easy' and 'custom' wireless settings, the latter enabling you to control multiple flashguns, in different groups, as well as whether the pop-up flash is used as part of the lighting setup or just as a controller.



In 'custom wireless' mode, you can set the power ratio between the external slave flashgun and pop-up master



# PHOTTIX MITROS+ TTL TRANSCEIVER

£300  
\$400

A clever flashgun with an extra-long remote firing range, the Mitros+ competes at the highest level

**W**ith a Gn 58 rating, the Mitros+ almost rivals the Canon 600EX-RT, Metz 64 AF-1 and Nissin Di866 Mk II for claimed maximum power. It has a similarly advanced feature set. Highlights include -7 to 90-degree bounce, 180-degree swivel in both directions, and programmable strobe, HSS and rear-curtain modes.

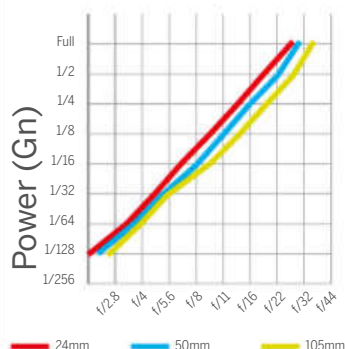
The Mitros+ also competes directly with the Canon 600EX-RT by featuring an RF transceiver. In fact, it has a Phottix Odin transmitter and receiver built-in, as well as a Strato receiver, enabling remote firing over up to 100 metres. The flashgun can therefore be used on-camera as an RF controller, or off-camera with RF triggering from Odin or Strato triggers.

Luxuries include a weather-sealed mount and an external power socket that's compatible with the Canon CP-E4 battery pack. A diffusion dome is supplied, in addition to the built-in wide-angle diffuser and fill-in reflector card, while

other connectivity sockets include USB and PC sync.

## Performance

Whereas the Nissin Di 866 II tended to underexpose by nearly a stop in our E-TTL accuracy tests, the Mitros+ overexposed by a similar amount, giving overly bright results. Maximum output is higher than the Nissin, but not as powerful as the Canon 600EX-RT or Metz 64 AF-1. Recycling speeds are faster than the Nissin when using Ni-MH batteries. With a little negative flash exposure compensation, the Mitros+ gives very good results.



## FEATURES

- 01** The large flash head houses a pull-out wide-angle diffuser and reflector card.
- 02** Like the 600EX-RT, the hotshoe foot has a weather-seal shroud.
- 03** A Phottix Odin transmitter and receiver, plus Strato receiver, are built-in.
- 04** It's not colour, but the backlit LCD is nevertheless clear.
- 05** Menus are navigated via a four-way pad and Set button.

## VERDICT

### FEATURES

★★★★★

### BUILD QUALITY

★★★★★

### PERFORMANCE

★★★★★

### VALUE

★★★★★

### OVERALL

★★★★★

## ADVANCED FLASHGUN MODES

Flash in broad daylight or use modes to extend your gun's powers









**C**anon D-SLRs typically have a flash sync speed of 1/200 or 1/250 sec – the maximum shutter speed you can use without part of the frame being underexposed due to the shutter not being fully open for the duration of the flash. HSS (High Speed Sync) mode enables you to use flash even at the fastest shutter speed available in your camera – when you

want to use fill-flash on a sunny day, or for freezing action – although the maximum output power will be significantly reduced. Other advanced modes include 'rear curtain' where the flash fires at the end of the shutter cycle, and 'stroboscopic' mode, where multiple flashes are fired during a long exposure, for capturing multiple views of a moving object in a single image.



**HSS flash mode enables you to use fill flash at even the fastest shutter speeds, for correct exposures under direct sunlight**

## COMPARISON TABLE

	CANON SPEEDLITE 320EX	CANON SPEEDLITE 430EX II	CANON SPEEDLITE 600EX-RT	GLOXY GF-F990	METZ 52 AF-1	METZ 64 AF-1	Nissin Di866 II	Phottix Mitros+
								
MAX CLAIMED GN (ISO 100, METRES)	Gn 32	Gn 43	Gn 60	Gn 54	Gn 52	Gn 64	Gn 60	Gn 58
BOUNCE (DEGREES)	0 to 90 degrees	0 to 90 degrees	-7 to 90 degrees	-7 to 90 degrees	0 to 90 degrees	-9 to 90 degrees	0 to 90 degrees	-7 to 90 degrees
SWIVEL (LEFT/RIGHT)	180 / 90	180 / 90	180 / 180	180 / 180	180 / 120	180 / 120	90 / 180	180 / 180
ZOOM RANGE	24-50mm (manual)	24-105mm (auto)	20-200mm (auto)	18-180mm (auto)	24-105mm (auto)	24-200mm (auto)	24-105mm (auto)	24-105mm (auto)
WIDE-ANGLE DIFFUSER	No	14mm	14mm	14mm	12mm	12mm	18mm	14mm
REFLECTOR CARD	No	No	Yes	Yes	Yes	Yes	Yes	Yes
AUTO METERING	E-TTL / E-TTL II	E-TTL / E-TTL II	E-TTL / E-TTL II	E-TTL / E-TTL II	E-TTL / E-TTL II	E-TTL / E-TTL II	E-TTL / E-TTL II	E-TTL / E-TTL II
FLASH EXP COMP	Via camera only	+/-3EV	+/-3EV	+/-3EV	+/-3EV	+/-3EV	+/-3EV	+/-3EV
MANUAL POWER	Via camera only	1/1 to 1/64	1/1 to 1/128	1/1 to 1/128	1/1 to 1/128	1/1 to 1/256	1/1 to 1/128	1/1 to 1/128
AF-ASSIST BEAM	Flash strobe	Red lamp	Red lamp	Red lamp	Red lamp	Red lamp	Red lamp	Red lamp
SECONDARY LAMP	Slave only	Slave only	Master/Slave	Optical slave only	Master/Slave	Master/Slave	Master/Slave	Master/Slave
EXTRA MODES	HSS, RC	HSS, RC	HSS, RC, Strobe	HSS, RC, Strobe	HSS, RC	HSS, RC, Strobe	HSS, RC, Strobe	HSS, RC, Strobe
TTL EXP ERROR	-0.17EV	0EV	0EV	-0.67EV	+0.5EV	+0.33EV	-0.83EV	+0.83EV
FULL RECYCLE (NIMH/ALKALINE)	2.7/3.7 seconds	2.5/3.8 seconds	3.0/4.7 seconds	3.1/4.6 seconds	4.1/5.2 seconds	3.4/7.4 seconds	4.3/6.5 seconds	3.5/7.1 seconds
FLASH INFO LCD	No	Yes	Yes	Yes	Yes (touchscreen)	Yes (colour touchscreen)	Yes (colour)	Yes
SUPPLIED ACCESSORIES	Pouch, foot	Pouch, foot	Pouch, foot, filters	Pouch, foot, dome, filters	Pouch, foot	Pouch, foot	Pouch, foot	Pouch, foot, dome
DIMENSIONS	70x115x78mm	72x122x101mm	80x143x125mm	75x148x105mm	73x134x90mm	78x148x112mm	74x139x113mm	78x147x103mm
WEIGHT	275g	320g	425g	340g	346g	422g	380g	427g
TARGET PRICE	£175/\$210	£200/\$250	£450/\$500	£130/\$200	£180/\$300	£300/\$480	£200/\$350	£300/\$400
FEATURES	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
BUILD & HANDLING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
PERFORMANCE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
VALUE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

## THE WINNER IS... CANON SPEEDLITE 600EX-RT

It's simply the best overall flashgun on the market for Canon EOS DSLR users

Everything about the 600EX-RT screams 'professional quality', from its massive output power to its unerringly accurate and consistent E-TTL metering. Build quality is top-notch, and the range of high-end features includes all imaginable flash modes, along with powerful wireless radio triggering. The catch is it's the most expensive flashgun here at £450.

Our second-favourite flashgun is the Metz 64 AF-1, which again delivers excellent performance

and plentiful power, while the similarly feature-packed Phottix Mitros+ takes third place. The Metz 52 AF-1 has a relatively reduced feature set, but it's still an advanced flashgun that has excellent wireless master/slave functions and is a great buy at the price.

If you can live with only a basic optical slave function, the Gloxy GX-F990C is an impressive performer with a wealth of advanced flash modes, and is unbeatable value for money.





# THE MAGAZINE FOR REAL PROS



**GET 4 ISSUES FOR £5\***

[www.myfavouritemagazines.co.uk/prophoto15](http://www.myfavouritemagazines.co.uk/prophoto15)

\* UK only - terms and conditions apply. For our special overseas offers see the website.

Also available on your tablet or phone!





The *only* Canon DSLR mag **Now bigger and better**

# PhotoPlus

THE **CANON** MAGAZINE







# 100% DSLR 100% CANON

The *only* magazine for Canon DSLR photographers

[www.myfavouritemagazines.co.uk/photoplus](http://www.myfavouritemagazines.co.uk/photoplus)

